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Child Research in a Medical School*

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Ever since I was a medical student I have been interested deeply in problems of medical education. In the beginning, I was concerned with finding ways and means of bridging the gap between the so-called pre-clinical sciences and clinical medicine. As at least one or two of my audience may remember I made something of a nuisance of myself on this subject as a senior student. In a book by Sir James McKenzie, which I read during my intern years, I made a marginal notation—for me a sign of an unusually powerful urge to record an idea. This idea was in the form of an inquiry. "Why has not medicine been more concerned with the problem of obtaining a thorough understanding of the whole life cycle of the human organism during healthy growth and development"? This seemed to me then—and now—the logical base on which to build a knowledge of the departures from average health which may represent disease. It seemed, also, that it might represent a natural means of forging the preclinical sciences and clinical medicine into a more unified science of man.

About sixteen years slipped by before I attempted to arrange my thoughts on this subject in orderly sequence for public view. During this time the idea underwent some changes and considerable elaboration. Last winter, I ventured to present some of these thoughts under the title, "The Place of Child Research in Medicine.[1] By way of explanation it was noted that this paper was "suggested by a study of the growth and development of the individual child." It is this type of continuous longitudinal study of individual children through significant portions of their life cycle to which my title today refers. During the past eight years, I have combined the teaching of pediatrics with the work of the Child Research Council of Denver. Therefore, the easiest as well as the most convincing way of stating my case will be to describe our program of investigation.

The Child Research Council is a small independent institute, closely affiliated with and housed in the School of Medicine of the University of Colorado.

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*From the Child Research Council and the University of Colorado School of Medicine, Denver.
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1. The Place of Child Research in Medicine. Some Contributions to Medical Thought Suggested by a Study of the Growth and Development of the Individual Child. Proc. Inst. Med. Chicago, 12, No. 2, (Feb. 15) 1938.

Its staff of twenty full time and fourteen active volunteer members is engaged in studying one hundred children. Each child is followed at regular intervals from birth to maturity, many different aspects of his growth and development being subjected to observations, measurements and tests of one sort or another. These children represent a rough sampling of our population, excluding the lower social and economic strata. The sampling thus yields a clientele similar to that of the average practitioner. The babies are all apparently healthy at birth when our observations begin.

It is difficult to describe our purpose in a few words. Our chief goal might be described as the obtaining of more reliable "normal standards" for healthy children during their years of growth. Such a brief statement, however, requires considerable amplification. As we all know, the so-called "normal" for height or weight, or for any of the parts and functions of the growing child, cannot be represented by a single figure or even by a simple line curving across a chart. On the contrary, it must be conceived as a range or zone within which differences may occur between equally healthy children of the same age. To be sure, the general pattern of growth is astonishingly constant but there are endless variations within the general growth trend. Furthermore, the timing of each new milestone in the progress of growth varies in different individual children so that our "normal standards" must allow for this. Each individual has his own peculiar characteristics not only of form and function at a given age level but also of growth pattern. Our standards must show not only the entire range of healthy variability but must also make it clear what percentage of all healthy children will tend to remain in the lower quarter, the middle half or the upper quarter of this range. We might say, then, that our first purpose in the Child Research Council is the more accurate charting of these zones. We desire to depict the whole range of variation during healthy growth for all parts and functions of the child which may lend themselves to accurate observation and measurement. But our ultimate purpose carries us well beyond this first goal.

It is, of course, useful to know the average figures for height and weight and for all the various parts and functions which we examine or test in the practice of pediatrics. It is even more useful to know how far above or below the average line any one individual may show deviation and still be considered healthy. But when Mrs. Smith brings in her son Robert for examination what you desire to know most of all is what may be optimum for Robert Smith. Let us suppose, for example, that his heart size is near the upper limit of the zone within which we have found that the heart sizes of one hundred healthy children will range at his age. Then, you want to know whether that is or is not the optimum heart size for Robert. Obviously, it is possible that a year ago his heart size was near the bottom of the zone. If so, then its sudden increase in size should suggest abnormal cardiac enlargement resulting from disease. In other words, we search for criteria which will enable us to say that for Robert Smith, his height, weight, dental development, heart size and function, blood counts, or basal metabolism are or are not at their optimum level.

The staff of the Child Research Council is following each one of approximately one hundred children from birth to maturity since one could hardly hope to create such an understanding of "normal standards" in any other way. In fact, one cannot even define clearly the borderline between health and disease, except by following the same individual over a long time interval. Many observations are made on children at a given stage in their development which reveal a great deviation from the expected average to suggest disorder. When these children are followed for months or years, some such findings turn out to be merely individual deviations entirely within the limits of healthy growth, while others are found to have represented the start of some disorder. McKenzie was able to describe "sinus arrhythmia" as "the childhood rhythm," entirely consistent with health only because he had followed individuals who showed it from early childhood on into mature life. Whether we are dealing with cardiac signs, pecularities in a roentgenogram of the lungs or a so-called behavior problem we still find this "wait and see" policy to be the only sure test of whether or not the condition found deserves inclusion within the zone of healthy variation or not. To build into this concept of a healthy zone an understanding of optimum growth and development of the individual requires a longitudinal study of the early portion of the human life cycle in a large enough group of children to give the whole range of variation.

In the search for increasing insight into the varying levels which may represent optimum for different individuals, it is necessary that the longitudinal study of children be well balanced. That is, many different aspects of their growth and maturation must be followed simultaneously. If we wish to establish criteria which will enable us to say that Robert Smith's heart is of optimum size for Robert Smith, we can do so only because we have studied both Robert and other children with similar hearts from the standpoint of body build, chest size, lung capacity, tolerance for exercise, behavior and many other aspects. Consequently, the Child Research Council is carrying out a wide variety of observations and examinations covering many different parts of the child, the functions of various systems, his mental growth, the emergence of his personality, and the environment in which he is developing. Each child is seen by six physicians who follow him at intervals of three months. He is seen also at 3, 6, or 12 months intervals by our full time research workers in anthropometry, dentistry, metabolism and psychology. His home is visited a number of times a year and his school at least once each year.

Such a study implies also consistency and continuity. So, we attempt to include as much permanent and objective material as possible in the record on each child. Thus, for example, photographs, roentgenograms and plaster casts of dental impressions can all be made to serve the study of the development of teeth, jaws and head. Various photographs and cinema studies, roentgenograms of head, teeth, long bones, heart and lungs, electrocardiograms, blood studies, blood pressure recordings, basal metabolism, vital capacity and a number of other determinations are obtained routinely on every child at regular intervals.

And, finally, such continuous longitudinal studies of growing children re-

quire able research workers and facilities for pursuing a variety of problems into the laboratory. Hence, the Child Research Council has maintained a close affiliation with the School of Medicine in whose science laboratories a number of its staff members are always busy on some problems. These have been conducted as joint enterprises by the faculty of the Medical School and the staff of the Child Research Council.

In working out "normal standards" in the form of ranges for any given part or for its function during the years of growth we may say that we are engaged in the analysis of individual children. Thus, for example, in studying the size, sounds and efficiency of the heart in each of a group of children we are looking, first of all, at an arbitrarily isolated organ. But each child, actually, is a complete biologic unit,—a whole living functioning organism—which must be understood as such before we can estimate safely what is optimum for his heart. So, although we are engaged now, primarily, in analyzing the various parts and functions of these children as they grow and mature, yet our ultimate goal must be achieved by synthesis—or rather by many, many syntheses. By way of preliminary practice in solving this problem of synthesis, the staff gathers about the round table once each week. The morning is spent presenting and discussing all the data which we have gathered on some one child. There is, of course, a gigantic task of careful, statistical analysis and correlation but this is progressing very slowly and cautiously. Three of the staff are well trained in this field—pediatrician, psychologist and anthropometrist.

In spite of the fact that it is much too early for any general conclusions, many stimulating ideas are suggested by such a study. The lack of reliable "normal standards" or ranges is striking in many fields, even including anatomy. There is an extraordinary amount of variation between so-called average children during apparently healthy maturation. The deviation from the average expectation in any one individual, during different age levels of his growth and development, are greater than has been recognized commonly in the past. Our methods and equipment for studying human growth are quite imperfect. We need to develop new technics and greater breadth of vision and thinking. We need new methods of analyzing our data and estimating their significance. We are badly in need of a personnel better trained for this type of long term investigation. And, finally, the longitudinal method of studying individuals, with a balancing of anatomic, physiologic and psychologic investigations on each child, appears to be the method of choice.

The staff of the Child Research Council cosists of twenty full-time salaried workers and an equal number of volunteer workers, including clinicians and members of the science departments of the School of Medicine. We have had a very heterogeneous group, including representatives of all the medical sciences, of sociology, psychology and pediatrics and of a few of the other clinical branches of medicine. My contacts with this group have been most interesting. Our philosophy has been to make use of the knowledge and skills from the various medical, biological and social sciences as instruments for the study of the indi-

vidual child. In general, those in the fundamental science group grasp the value and meaning of the study most easily and those in the clinical group least easily. Occasionally, the man working in one field of science resents the use of his science as a means to an end. Occasionally, he has difficulty seeing through the barriers separating his science from another. Sometimes, he finds it hard to visualize the need for final synthesis into the whole living person. However, the average clinician appears to be beset with even greater difficulties.

Even a well trained young pediatrician, three or four years out of one of our best medical schools, may have great difficulty in grasping the need for or significance of such a program of child study as I have described. The value of understanding the child as an individual, the paucity of our knowledge concerning the boundary between the normal and the abnormal, the need for a familiarity with individual variations during healthy growth, all these appear to be ideas to which he has given little thought. If he has given them any thought, at least, he seldom seems to have considered how such knowledge may be acquired. Gross disease, as seen in the hospital wards, was easy to differentiate from a state of health. The average young doctor seems to be quite unprepared for the frequency with which, in practice, he will be unable to say whether a certain finding in a given child is within the limits of health or not. Only the wiser minority seems prepared to find out for itself by applying the principle of "wait and see."

In this brief sketch of the program of the Child Research Council I hope I have succeeded in suggesting some of the possible benefits of such an institute to a medical school center. Concerning some of these, I can speak from actual experience. Other benefits remain, as yet, in the hypothetical realm. In discussing whatever healthy influences may result from the presence of such a longitudinal study of the human organism I shall be critical of the average medical school curriculum. If I seem to be hypercritical, please remember that I am speaking not as an outsider but as a member of a medical school faculty and as a past member of the faculty of two other excellent schools.

I suppose there can be no serious objection to my assumption that the main purpose of teaching in schools of medicine is to train young men and women to practice medicine. Therefore most of my remarks will be directed toward the problem of turning out young doctors whose equipment to practice medicine is sound. Being a pediatrician, it is only natural that I should be concerned particularly about pediatric training. However, I believe there is as much fault to be found with the four years of medical school as with what we may call the postgraduate years of interning, imperfect as the latter may be. When one considers the present medical curriculum from the standpoint of its usefulness in training men for research or for teaching, it seems to offer no more encouraging a picture than for training practitioners. Assuming that the teachers and investigators are to remain in the fields of medical science, which deal primarily with improvement in the health of human beings, then much the same arguments may be used as for the training of practitioners. Therefore, I shall consider

medical teaching as a whole without attempting to split it into more specialized functions.

During the last half century much has been written about the need for the physician to understand his patient as a living, functioning, biologic unit. I might spend my entire allotted time quoting passages that are apropos from the writings of such men as Oliver Wendell Holmes or Sir James McKenzie in the past or from the writings of present day workers in the fields of biology, physiology and clinical medicine. A few brief quotations must suffice.

Wm. DeB. MacNider has said: "Normal physiological life is a balanced related existence of an organism . . . to its ever changing environment . . . The function of the adequately trained and, of more importance, thoughtful physician is to keep this ever-changing life in a balanced and related state, so that the manifestations of its life, its symptoms, may fall in that category of reactions which are called normal. . . . The physician must be biologically minded and through this mind attempt to see the organism as a whole in all its somatic and psychical departures from the normal. The organism furthermore must be seen as individual and related as individual in a happy, useful, and effective environment." We might add that as a biologist he must have learned how to anatomize intelligently during the course of his analysis but that he must have learned also how to synthesize. And synthesis, as Frank Lillie has pointed out, "always involves the living organism." He must have become familiar with the fact that such analysis and synthesis involves the time concept in the life of the individual. To quote Lillie again, "Time is of the very essence of life and is required for biological organization, whether arising in the course of countless ages of evolution or in the course of the development of the individual." In training the student to become such a biologically minded physician, the average medical school curriculum would seem to be far from adequate.

In anatomy, physiology, histology or biochemistry we do a great deal of analyzing of parts and functions. We lay down certain rather standardized rules based on the averaging of data obtained by such analyses of many adults and of all too few children. What do we teach concerning synthesis into a functioning living organism? It is not a standardized average or norm but the actual living individual during health or disease which the student must learn to handle. What do we accomplish in our science courses by way of preparing him for this responsibility? Medical education has made real advances in this regard during recent years. In spite of this, we are forced to admit that we analyze and anatomize a great deal but succeed only rarely in giving the student the ability to synthesize in terms of the endless variety found in actual healthy functioning human individuals. All too frequently, the extensive analyses done in the early years are tucked away after passing the final examination. Such syntheses as are attempted in the clinical years often bear little relation to the earlier analyses, sometimes even deteriorating into mere rule of thumb procedures.

Another question which seems pertinent concerns the early period of human

life. The biological organization which we study in the adult evolves from embryonic existence to maturity in from fifteen to twenty years. The tiny infant is not simply a small or scaled down adult. I feel sure that before such an audience as this I need not dwell at length on the great variety and number of evidences at hand that the period of infancy and childhood must be considered separately. Bone development, blood formation, heart growth, changing body proportions and a score of other attributes make the growing child distinctive not only from the adult but actually from himself at different age levels. Moreover, it seems plain that to understand even the mature human organism, we must know "how he got that way." Can we, in fact, pretend that we are teaching students to be biologically minded physicians unless we are helping them to analyze and synthesize in terms of the whole life cycle of the human being from conception to old age?

In implying that we, as medical teachers, are falling down on this particular part of our job I do not want to be misunderstood. There are many splendid departments of anatomy, physiology and biochemistry in approved medical schools today. I know that the men in many of these departments are doing outstanding work in their given fields. There are also many able teachers. There are even evidences, here and there, of a healthy breaking down of the rigid barriers so often set up between departments. It is not so much in the organization or progress of the individual department that we have failed. It is, rather, in the proper use of all this brilliant personnel and splendid equipment for teaching students to be good doctors that we seem to me to fall short of our goal. When he receives his M.D. degree, the student should be able to use all these sciences as instruments by means of which he may understand the individual patient. Relatively few seem to be able to do this effectively. Is not this partly because, in most places, the sciences have failed to concentrate together on what is really the main objective, namely to produce a well coordinated program of study which will teach the student what people are like, in health and in sickness.

No doubt there are many changes which we might make in our medical school curricula and, in fact, in our whole system of training young doctors. Some would recommend minor and some major changes. During my last eight years of combined teaching and child research the conviction has grown steadily that some rather fundamental changes are needed. This conviction has been strengthened by noting the beneficial effect which may result when an institute such as the Child Research Council is organized within a medical school center. My first concern as director was with the value of the School of Medicine to the Child Research Council. I have stated elsewhere my belief that to use safely and effectively the biological, medical and social sciences as instruments for furthering the study of the growing child, such a close affiliation was essential for the research institute. Now, I have become just as much interested in the other side of the picture. It has become apparent that such a study of the maturing human individual within a medical school group exerts a healthy influence on the school and on its teaching. Let me illustrate this with a few

examples of what has actually been accomplished through the affiliation of the Child Research Council with the School of Medicine of the University of Colorado.

In the departments of anatomy, pathology, biochemistry and clinical pathology we have maintained full time research workers continuously since 1932. In the departments of physiology and bacteriology we have had staff members working for briefer periods. Consider what it means to faculty, graduate students and medical students to have some one in each of the science departments working on problems related to the years of growth and development—on problems concerned with health rather than with disease. These research workers are paid by the Child Research Council. They are under the guidance of its director together with at least one member of the medical school faculty from the department in which the investigation is being carried on. The director's chief function is to be certain that the investigation in progress contributes to our main interest of building up more reliable "normal standards." He must be concerned constantly with its correlation, immediate or potential, with other studies going on in other divisions of the institute's total program. Thus, frequent conferences with both faculty members and Child Research Council staff members lead to an ever increasing interest among faculty members in the task of gaining a better understanding of the growing child.

Frequently, two or more members of my staff, working in different departments of the school, either become interested in the same problem from different angles or else find that two apparently different investigations have reached a common meeting place. This, of course, is positively exciting since it opens connecting corridors passing through the barriers which so often separate science departments.

Another source of stimulus to the school is dependent on the fact that we have acquired personnel and equipment which enables us to do certain things better than any one else in the community. For instance, if some member of the faculty has as a teaching case a child of 5 or 6 years of age on whom he desires an accurate basal metabolism determination, he will request that we do it. When it is done, he may see just how his patient's basal metabolic rate compares with those of the healthy children in our study series. This is a very painless form of education since it is accomplished almost automatically in the process of giving him the service he wants to help him understand his patient. Sometimes, we have to say that we are quite willing to carry out a certain pro cedure but that the result will not mean much since we have not, as yet, any reliable picture of the range during health. Such an experience appears to be quite thought provoking to the inquiring physician.

In addition to these generally beneficial influences, there are others which are more obvious. The director of the Child Research Council holds a faculty position in the pediatrics department. During any average year not only the director but four or five other members of his staff take some active part in the teaching of medical students. We have tried not to abuse this opportunity by

pressing our point too hard. Our aim has been to introduce data or materials from the Child Research Council investigations only when they fitted naturally into the picture. This has applied to such fields an anatomy, pathology, biochemistry, clinical pathology and even to my course in infant nutrition. There has been only one exception, a brief course which I have been allowed to conduct for the second year students. A few comments about this course may not be amiss.

It starts during the middle of the sophomore year while the average student is still absorbed with his so-called preclinical sciences. I meet the students quite informally in groups of about ten. We start by defining pediatrics, which leads us to consider the whole broad field of child health, including growth and development. Next, we discover, through carefully chosen illustrations, how necessary it is to apply the knowledge gained in the sciences to understand a clinical situation. For example, the need for a thorough grasp of the subject of acid-base and water balance is obvious when they have considered the diagnostic and therapeutic puzzles presented by an infant with an acute diarrhea and vomiting. Our next step is to inquire how well their knowledge gained from their science courses enables them to understand the healthy baby. That is, can they appraise the healthiness of a small infant. At this session we have a couple of small healthy babies with us in the seminar room. One of my favorite starts for this hour is to inquire what anatomy has taught them concerning the strongest muscle groups in the body. Then, the student who answers is asked to pick up one of the babies. The rest of the hour is certain to be filled with lively anatomical and physiological discussions. These opening discussions pave the way for a brief consideration of Child Research Council investigations and the importance of understanding something about growth and maturation with its endless variations within the limits of health. A few visits to the pediatric ward of the hospital enable us to see the need for understanding the range of the "normal" if we are to interpret deviations from the average with wisdom. The course must be fitted into a time allowance of twelve hours for each section.

This completes a brief survey of what I am able to describe from actual experience. It has seemed to me that this represents a sound beginning in the process of strengthening some of the weak spots in the average medical school curriculum to which I referred earlier in this paper. I should not care to have any one present think that I am offering the mere presence of a child research institute as a panacea for whatever may ail a given curriculum. In the first place, our present closeness of affiliation with the school has not been gained without the expenditure of a great deal of time, thought and effort. We have had to combat many factors in addition to the usual inertia to any change. I need not list these since I am certain that you are familiar with such problems as departmental space allotment, the number of teaching hours per department, the academic status of research fellows, credit for advanced degrees, salary scales and the like.

In the second place, I am far from satisfied with what we have accomplished

during the past eight years of this affiliation. I wish that the student might have the opportunity of visualizing his problem of understanding what people are like before he ever started the study of the medical sciences. If this could be done, then I should hope to see each science department start its course with a consideration of the characteristics of the growing, changing human organism. The teacher should carry the student from an understanding of prenatal life, through the hectic readjustments of the newborn babe, the rapid strides in the maturation of the infant, childhood and that "no-man's land" of adolescence, up to the mature organism. At this point, I should like to see pediatrics take up the burden as the most important clinical department during the transition from the student's study of the fundamental sciences to his acceptance of clinical responsibilities. The active part played by the child research institute would be maximum at this point. Following this I should hope for closer co-ordination between the study of the human life cycle during health and the study of diseases as conducted in the clinical departments. This is a conservative or minimum program. For a more radical proposal, I shall refer those of you who may be interested to my paper of last winter, "The Place of Child Research in Medicine."

In closing, I should like to quote from a paper read by Frank Lillie at the semicentennial celebration of Sigma Xi. "Huxley, in 1851, defined the biological individual as 'the sum of the phenomena presented by a single life; in other words, it is all those animal forms which proceed from a single egg, taken together.'

"May I restate this by saying that the biological organism is its life history, complete from gametes on; this is the real unit of biology. This unity of the life history is implicit in Weismann's conception of the germ-plasm;and becomes more explicit in the modern genetic theory of chromosomes and genes carried unaltered throughout the life history in all cells. Prospective significance in embryonic development is based on the conception of unity of the life history; functional relations in physiology imply the same principle; adaptive behavior and learning in psychology have similar reference to the past and future, and similar implications of the unity of the life history of the individual."

Such a child research institute as I have described would appear to be a legitimate child of this sound biological concept. As such, the value of its program and of its philosophy to medical education can be questioned only by denying that man is a biologic unit.

Aptitude Test Scores, Premedical Grades, and First Year Medical Grades, During Six Years at West Virginia University*

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The problem of selecting students is ever before medical schools. This paper records a chapter in the experience of one of the small medical schools which gives only the first two years of the course and is consequently under the necessity of selecting students and training them in a manner which will make them desirable students in the upper classes of other medical schools. Up to 1935, the administration then in power felt that inasmuch as West Virginia University was a state institution supported solely by taxes collected within the state, it was obligated to admit all residents of the state who met the hour and subject requirements, even though their scholastic records might be low. In addition, there were admitted a varying number of nonresidents, selected largely in order of application, rather than on the basis of scholarship or promise of performance. Consequently, the selective process was operative almost entirely after the students had entered the Medical School, as a result of which there was always a large percentage of failures. Beginning with the class entering in 1935, the number of students admitted was greatly reduced, the admissions being determined on the basis of scholarship records and other available information.

This experience is of interest in connection with a remark of Dr. Chesney[1] who mentions the desirability of "the crucial experiment of admitting an unselected group of students; and after they have completed the work, of determining which method would have admitted the better group." The admissions committee of West Virginia University has been trying to evaluate these earlier, unselected classes in a way which will give useful information for the choice of students. A brief statement of our experience may be of interest.

This paper presents data concerning 220 students admitted in the unselected classes during the years 1932, 1933 and 1934; and 223 applicants during the years 1935-1938 whose records have been received and evaluated. We have studied not only correlations of aptitude scores and premedical grades with first year medical grades, but we have also studied the correlation between aptitude scores and premedical grades. Of the 443 students represented in this study, 198 did all their premedical work at West Virginia University; 150 did part of it there, making a total of 248 with grades from West Virginia University. There were 194 who did all their work elsewhere. The records of these students

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1. Chesney, Alan M.: Evaluation of the medical aptitude test. Report of Special Committee. J. Assoc. Am. M. Cols., 11:15 (Jan.), 1936.

include work done in 107 colleges and universities in addition to West Virginia University. Doubtless, comparisons involving premedical grades would be amenable for more accurate interpretation if all grades earned were from the same institution, or if some practical plan could be devised to measure the relative value of grades earned under the different standards of the various institutions. Though every admissions officer has some knowledge of the value of grades given in many institutions, nevertheless, he must make the decisions from mixed records wholly comparable to those used here.

The data presented here are included in six scatter diagrams and one table. The average grades have been computed by assigning numerical values to the letter grades for each semester hour as follows: A, 10; B, 8; C, 6; D, 4; E, 2; F, 0. The lowest passing mark is D. Grades from institutions using different grading systems were, so far as possible, brought into line with this plan. Grades in military science and physical education are not included. The aptitude test scores are the original values of the Committee on Aptitude Test. When the aptitude test was taken more than once the average score was used. We have made no adjustment for the year in which the test was taken.

Inspection of the scatter diagrams shows that the records do not fall close to any line which might be drawn through them; that is, the correlation is never very close. Nevertheless, these charts show some correlation, in that there is a general tendency for the records to assume a diagonal orientation instead of being scattered wholly at random. In these respects, our data agree fully with those presented in other studies of the problem of admissions.

To make the relations more evident, in each chart the regression line has been drawn for each of the sets of records. This was done thus, as e.g., in Chart 1: The average grade value (arithmetic mean) was calculated for each of the five vertical columns (arrays) of aptitude values and the position marked by a cross. These five points were then connected by a continuous line, the line of regression of grades with respect to aptitude scores. If there was not any correlation between premedical grades and aptitude scores, this line would be horizontal instead of inclined. Similarly, the average aptitude score for each horizontal column or array of grades was calculated, and the position marked by an "X." These positions were connected by a broken line, the regression line of aptitude test scores with respect to the grades. If there was not any correlation, this line would be vertical. The angle at which the two regression lines meet is a measure of the degree of correlation of the two sets of values. If the correlation was perfect, the two lines would coincide, their position being oblique; if there was no correlation, they would meet at right angles.

In all probability, these lines would be straight if the examples were sufficiently numerous, and, as a matter of fact, when the data presented in Charts 1 and 4 are plotted in one chart, the regression lines for the 443 students are much straighter than in either chart alone. On the assumption that the relation is rectilinear, the Pearsonian correlation coefficient and its probable error has been

computed for various sets of data using the method of Day[2]. Thirty-two of these correlation values are shown in Table 1. The values run from —.36 to .73. There are various opinions as to the significance of correlation values, but for data of this kind, the statement of Pearl[3] seems appropriate, to the effect that correlations from .00 to .40 are low; from .40 to .70 are substantial; and from .70 to 100 are high.

	YEARS	STUDENTS	APT X PM	APT X 1 MED	PM X 1 MED
Entrants	1932 - 34	194	.42 ± .04	.46 ± .04	.60 ± .03
"	" "	220			.60 ± .03
"	1932	62	.30 ± .08	.33 ± .08	.63 ± .05
"	1933	64	.34 ± .07	.53 ± .06	.53 ± .06
"	1934	68	.53 ± .06	.48 ± .06	.72 ± .04
Applicants	1935 - 38	223	.22 ± .04		
"	1935	60	.34 ± .08		
"	1936	44	.22 ± .10		
"	1937	54	-.36 ± .08		
"	1938	65	.35 ± .07		
Entrants	1935 - 38	98	.16 ± .07		
"	1935 - 37	70	.11 ± .08	.39 ± .07	.28 ± .07
"	1935	24	.24 ± .13	.54 ± .10	.11 ± .14
"	1936	20	.43 ± .12	.73 ± .08	.58 ± .10
"	1937	26	-.33 ± .12	.18 ± .13	.17 ± .13
"	1938	28	.29 ± .12		

TABLE 1. Correlation coefficients between: (1) aptitude test scores and premedical grades (APT X PM) for 443 applicants and entrants for seven years; (2) aptitude scores and first year medical grades (APT X 1 MED) for 264 entrants for six years; and (3) premedical grades and first year medical grades (PM X 1 MED) for 290 entrants for six years. Correlations are computed by years and groups of years. The lengths of the black bars are proportional to the correlation coefficients.

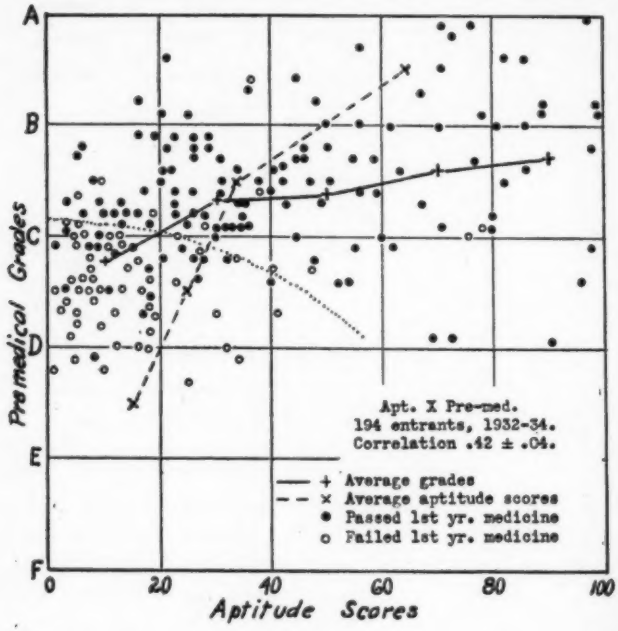
These studies, like many others, concern themselves largely with first year survival rather than with total success in the study and practice of medicine; accordingly, grades beyond the first year are not included. In the charts, "first year failure" indicates that the student made a record which prohibited him from continuing in the school. Records close to the base of the charts, the "F" line, indicate that the student did not receive any credits, either on account of failure in all subjects or on account of withdrawal from school while doing failing work.

2. Day, Edmund E.: Statistical Analysis. The MacMillan Company, New York. 1930.
3. Pearl, Raymond: Medical Biometry and Statistics. W. B. Saunders Company, Philadelphia, 1923.

Full description of each chart is given adjacent to it. The classes used in the study included a total of more students than appear in the charts, but some had not taken the aptitude test, others dropped out too early for scholarship to become evident, and a few others (repeaters) appeared in two class lists.

In Chart 1, the correlation coefficient is .42 ± .04. The correlations for the three separate years are .30, .34 and .53. This correlation, though not high, is of some significance. There is a wide range of grades at all aptitude levels. It is evident, however, that the grades tend to be better with the higher aptitude

CHART 1.—Premedical Grades and Aptitude Scores for the Unselected Classes Entering 1932, 1933, and 1934 (194 Students)



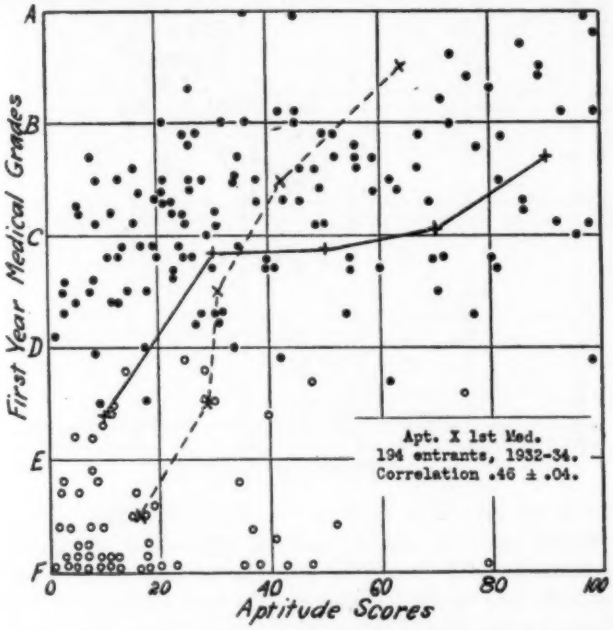
scores. The moderate slope of the line indicating average grades shows that there is correlation, inasmuch as the average grade for aptitude scores above 79 is B— while that for scores below 20 is C—. The slope of the line indicating average aptitude scores is also indicative of correlation, inasmuch as the average aptitude score for grades above B is 64, whereas for grades between C and D it is 25, and for those below C it is 15.

The practical interest of this chart lies in the fact that the first year failures (shown by open circles) were nearly all incurred by students whose average premedical grades were C or lower and whose aptitude scores were below 40. Nearly all students with such records failed. Moreover, study of records shows that of those who did pass the first year, nearly all received low grades and

continued to do poor work in subsequent years. The dotted line roughly separates the area of failure from the area of success. It is significant that those who had low records in both aptitude score and premedical grades had less chance for success than those who had low records in only one of the two.

In Chart 2 the correlation coefficient is .46 ± .04. The correlations for the separate years are .33, .53 and .48. This coefficient is slightly higher than that between premedical grades and aptitude scores (Chart 1), but the difference is so small as to be of doubtful significance. For aptitude test scores above 79,

CHART 2.—First Year Medical Grades and Aptitude Test Scores for the Unselected Classes entering 1932, 1933, and 1934 (194 Students)

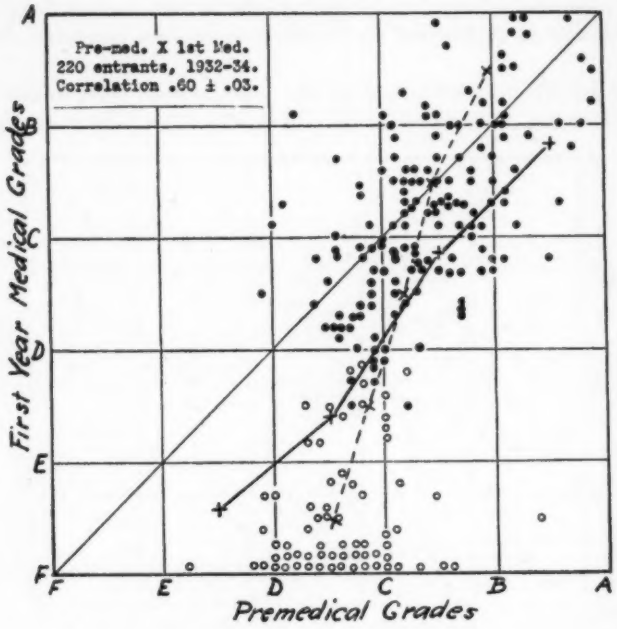


the average grade, B—, is almost the same as in Chart 1, but in the lower region of aptitude test scores the average medical grades fall off much more rapidly than do the premedical grades. This tendency is especially marked with scores below 20, where the average grade is E+; and where there were many failures, and no grades as high as B. It should be noted, however, that at all score levels there are low grades and some failures.

Most of the hopelessly low grades were made by students with scores below 20. The rejection of students with scores below 20 would have eliminated more than one-half of those who failed, some of those who made low grades, a few of those who made satisfactory grades, and no really excellent students. More than one-half of the students in this group failed in the first year. Excluding

those with scores below 40, would have shut out more of the failures, but would have shut out also a goodly number of definitely satisfactory students, if no other criterion had been used.

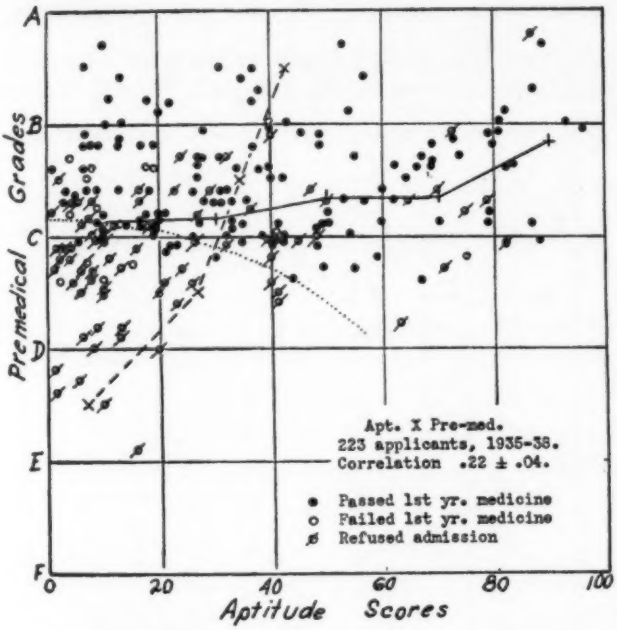
CHART 3.—First Year Medical Grades and Premedical Grades for the Unselected Classes Entering 1932, 1933, and 1934 (220 Students).



In Chart 3, the correlation coefficient is .60 ± .03. The correlations for the three separate years are .63, .53 and .72. This chart includes the same students as charts 1 and 2, plus thirty others in the same classes who had not taken the aptitude test, but the correlation is the same (.60) whether computed from the larger or the smaller group (Table 1). This is a high correlation coefficient, shown not only by numerical value, but also by the tendency for the individual records to be grouped along a line, and by the small angle at which the two regression lines intersect. If all students received the same grades in medical school as in premedical years, all records would be on the diagonal line of the square. It will be observed that though some students did better in medical courses than they had done in premedical work, the average medical grades were lower, especially for those whose premedical average was below C. The failures were nearly all incurred by students whose premedical average was C or lower. Relatively few such students received higher grades in medical school than in premedical work. If no student had been admitted with a premedical average below C, nearly all the medical failures would have been

excluded and about one-half the passing grades below C, and only a very few with an average above C. On the whole, the premedical grades gave a better index of success in the first year of medicine than did aptitude test scores, but the two records together had greater value than either one alone.

CHART 4.—Applicants for Admission 1935, 1936, 1937, and 1938. Premedical Grades and Aptitude Test Scores (223 Students).



In Chart 4, the correlation coefficient is .22 ± .04. The correlations for the separate years are .34, .22, —.36 and .35. Charts 1 and 4 are closely comparable, in that Chart 1 shows 194 students who entered in three consecutive, unselected classes (1932 to 1934) while Chart 4 shows the 223 applicants for the following four years. Chart 1 designates the students who failed the first year, while chart 4 shows both failures and rejections. The dotted line, occupying the same position in each chart, is a rough division between desirable and undesirable students.

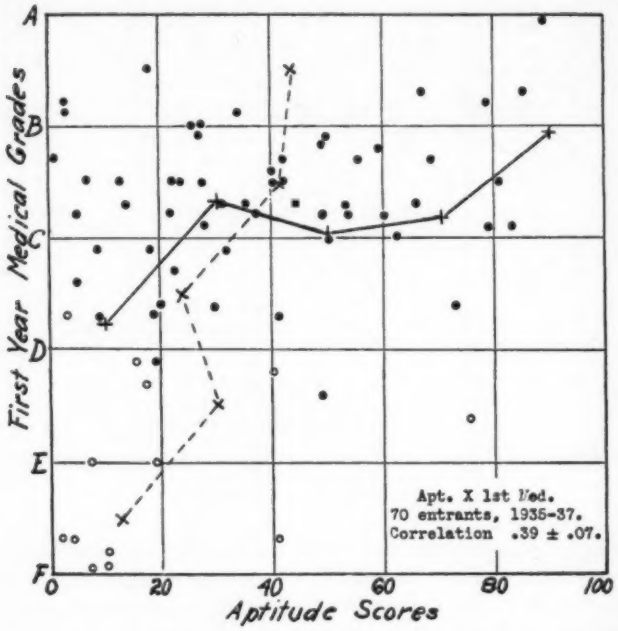
Though Charts 1 and 4 include student groups which are, in the main, comparable, there is a surprising difference in the coefficients of correlation between premedical grades and aptitude test scores in the two groups, being .42 in the former group and .22 in the latter, a definitely significant difference. Though no year has a correlation as high as the average for the preceding three years, the very low average for the four year period is mainly due to the negative correlation in 1937. Of the fifty-four students in that year, those with

low aptitude test scores actually received better premedical grades than did those with the higher scores (see Table 1).

The difference is evident in the scatter diagrams, by the fact that in Chart 4 the line indicating average grades is more nearly horizontal, and the line indicating average aptitude test scores is more nearly vertical, and that these two lines intersect at a greater angle than in Chart 1.

In the selection of students for admission nearly all applicants with grades below C and aptitude test scores below 40 were rejected on these criteria alone.

CHART 5.—First Year Medical Grades and Aptitude Test Scores in the Selected Classes Entering in 1935, 1936, and 1937 (70 Students).



Other rejections were based on lack of required subjects, previous failures in medical school, work done in colleges of low standing, nonresidence in West Virginia, lack of good recommendations, etc.

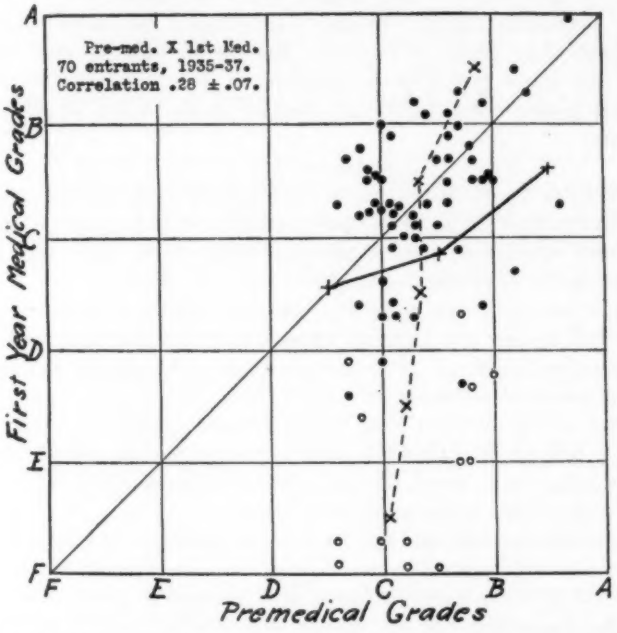
Certain seeming inconsistencies in acceptance and rejection are further explained by the fact that the chart covers four years, during which the standards for admission were steadily raised. For the present school year (1938-1939), no student was admitted with an average grade below C.

That the selection of students has been somewhat successful is shown by the fact that the failures for the three unselected classes (1932-1934) were 31 per cent, whereas in the three selected classes (1935-1937) they were 18 per cent, a decrease of 0.42 per cent. This decrease was accomplished at a time when

some of the better students were unwilling to enroll in the school on account of its uncertain standing, and when, in all probability, rising standards of scholarship in the school made it difficult for poor students to do passing work.

It is of interest that for the ninety-eight students admitted to medical school during the years 1935-1938 the correlation was .16 (Table 1), a figure even lower than for the 223 applicants for those years. The correlations for the four years were .24, .43, —.33 and .29 The negative correlation for 1937 is largely responsible for the very low average correlation for the four years.

CHART 6.—First Year Medical Grades and Premedical Grades for the Selected Classes Entering 1935, 1936, and 1937 (70 Students).



In Chart 5, the correlation coefficient is .39 ± .07. The correlations for the three years were .54, .73, and .18. The low correlation (.18), is for 1937 in which negative correlation was noted above with premedical grades. Charts 5 and 6 show the first year records of three of the four classes selected as in Chart 4. The correlation coefficient between first year medical grades and aptitude test scores is somewhat lower than in the unselected classes (Chart 2), though the difference, in view of the small number of students in the second group, may not be of definite significance.

Rejection of all applicants with scores below 20 would have excluded most of the failures, but would have excluded also some very good students. Comparison of Charts 2 and 5 shows that the first year average of those with scores

below 20 was higher in the selected classes than in the unselected classes partly because the percentage of failure was reduced and, partly, on account of some good grades made by this group.

In Chart 6, the correlation coefficient is .28 ± .07. The correlations for the three separate years were .11, .58, and .17. This is a rather low correlation coefficient in comparison with that for the preceding three years, shown in Chart 3, only one of the three years showing a substantial correlation. On the whole, during those three years, there was only a slight tendency for students with better premedical grades to do better work in medical school than did those with low premedical grades. The low correlation may be due, in large measure, to the decrease in the range of premedical grades brought about by the exclusion of those with the lowest grades, which has resulted in the admission of a rather homogeneous group. Another possible factor may be the absence of a really outstanding group of students. For the students of these years, the aptitude test scores gave a better prediction of first year attainment than did premedical grades, which is directly contrary to the results of the preceding three years.

SUMMARY

From Table 1 and the six charts the following observations are made:

1. Of the three sets of correlations computed, the lowest one, on the whole, was between aptitude test scores and premedical grades. This was also true for five of the six years taken separately.

2. On the whole, the correlation between aptitude test scores and first year medical grades, and between premedical grades and first year medical grades was about equal, i.e., the predictive value of the aptitude test scores and premedical grades was about equal.

3. But during the years 1932-1935, premedical grades had greater predictive value, whereas in 1934-1937 aptitude test scores had greater value, the difference being due to lower value of premedical grades rather than to higher value of aptitude test scores in the latter years.

4. Correlation coefficients had the following sequence of increasing magnitudes:

For 1932-1934, aptitude test scores, with premedical grades, was less than aptitude test scores with first year medical grades, which was less than premedical grades with first year medical grades.

For 1935-1937 aptitude test scores, with premedical grades, was less than premedical grades with first year medical grades, which was less than aptitude test scores with first year medical grades. (Or using symbols)

1932-1934: APT X PM <APT X 1 MED <PM X 1 MED

1935-1937: APT X PM <PM X 1 MED <APT X 1 MED

5. There was considerable yearly fluctuation in all correlation values, as follows:

APT X PM	varied from	—.36 to .53
APT X 1 MED	varied from	.18 to .73
PM X 1 MED	varied from	.11 to .72

6. There were high and low correlation classes, each class occupying about the same relative order in all of its correlations. The class of 1937 had the lowest correlations, both as to applicants and as to entrants. The class of 1936 had one of the highest correlations.

7. Though the coefficients of correlation give a measure of the average usefulness of both the aptitude test and the premedical grades in the selection of students, it must be remembered that in case of each individual student these measures must be used with caution, on account of the wide range of grades for any given aptitude test score value.

8. We have not observed any relation between degree of correlations and excellence of scholarship, either for classes as a whole or for individuals.

9. The low correlations do, however, introduce difficulties in the selection of students, in that when aptitude test scores and premedical grades give about the same measure of the applicant's suitability (when the correlation is high) these figures have greater predictive value than when the two tell a different story (when the correlation is low).

10. We have not attempted to make an analysis of the fact that aptitude test scores had a lower correlation with premedical grades than with first year medical grades, but if this relation holds in other medical schools, the whole question might be studied with profit. If this relation is found to hold generally, the fact is a tribute to the specific bearing of the aptitude test on fitness for the study of medicine.

DISCUSSION

DR. BEVERLY DOUGLAS (Vanderbilt University): I think both the Aptitude Test Committee and the Association owe Dr. Dodds a vote of thanks for the material he has presented. Anyone who has had anything to do with compiling such material will realize how tedious it may become. I wish to present a few facts from the material which we have compiled at Vanderbilt on the classes between the 1933 graduating class and 1937. This material will be published in the JOURNAL, so I will not burden you with very much of it now.

Dr. Zapffe has just published an article, which you have no doubt read, on the comparison of standing in class by thirds, for the 1936 class, freshman class only, in medical schools in the United States, and he aptly points out, that choosing the classes by thirds of premedical standing, 52 per cent only of the upper third remain in the upper third. That is an average of between 34 and 36. Fourteen per cent drop down to the lower third. Of the middle third, 20 per cent go up to the upper third, 40 per cent remain in the middle third, 25 per cent go to the lower third, and 10 per cent fail, which is rather an interesting fact. In the lower third, we find that 32 per cent attain the middle, or better, whereas 40 per cent remain in the lower third. Of that lower third of students all over the United States, 25 per cent fail.

Dr. Zapffe, very aptly, I think, is quite surprised that only 50 per cent of the students we take in the upper third will remain in the upper third. I think that this may be explained by the fact that there is a great variation, especially, perhaps, in the South. Not long ago, in an article, I pointed out that obviously an "A" in certain colleges may be the equivalent of a "B" or "B plus" in other colleges. This has led us to keep a card file system to show how many with similar grades perform in the medical school at Vanderbilt, and such a list has been helpful to us in remedying weak spots in the curricula or improving grading systems.

The present studies we have made of the aptitude test show that, taking the four year medical school performance, all four years, not just the first year, as given by Dr. Dodds, and correlating that with the premedical grade levels, both general and average grades included, that is, the science and general courses also, we get the following facts about these premedical grades in their correlations with the others in medical school:

The spread of the grades is only 4.2; that is, on a 100 per cent basis, from "A" to "C minus," or the lowest grades. We use a slightly different grading system from that presented here, A, B, C, D, E and F. We use A, A minus, B, B plus, and so on down to C minus, and there was only a 4.2 spread from the top grade to the lowest for these premedical grades from "A" to "C minus."

Also, there were no failures at all in the C, C plus and the C minus group; the C, C plus and C minus octaves of grades showed no failures in medical school for the four years, believe it or not. We had trouble convincing ourselves that these figures were correct, but among the 191 students studied there were no failures in the lowest grade groups.

The failures were in the A minus through the B minus groups. All the failures were in the upper 60 per cent of grades. Three-quarters of all the failures were in the upper 50 per cent of grades.

The spread of grades in the aptitude test, taking the classes of 1933 through 1937, from the first to the tenth deciles of the aptitude ratings, is 9.7. Remember, it was only, I believe, 4.2 in the other, the premedical grades, or almost 10 points between the highest and lowest deciles of the aptitude test ratings.

There were no failures in the upper three deciles of these brackets. The spread of grades was from 86.8 to 77.1 in the lowest decile. The great majority of failures were in the lower three deciles. In the case of the aptitude test ratings, only two failures occurred in 191 cases in the upper half of the aptitude test ratings. In the lower tenth, 25 per cent failed; 66⅔ per cent were below 80, and the average of the whole group was 77.1.

I feel that the later years of Dr. Dodds' studies mean more than the earlier years. I think that we might possibly say that, perhaps, the Aptitude Test Committee has been able to improve the test; that, maybe, it predicts with more certainty what a man will do if we give him a chance on this test, and certainly I think that we know from his studies that there is a great variable in the quality of grades in different schools, and for that reason we may suspect, at least, what is wrong with the premedical grade correlations with success in medical school.

I cannot refrain from reading a little poem that was sent me by a woman in the lumber business, boosting her business. She put advertisements in the paper and this poem is entitled, "What's the Matter with Them?"

"The meter will not 'mete' at all,
And gosh, what awful rhythm,
And some people like them,
And some people think they
are getting worse,
But since they're only lumber ads,
We call the stuff blank verse."

And I think we must expect, since we have only grades from a great number of different institutions, some of which are dissatisfied with their own grading, some to be better and some to be worse. We may, possibly, by improving the aptitude test and get a greater degree of correlation and to make this test a real criterion for entrance to medical school in the years to come.

Preventing Hereditary Diseases Which Wreck Childhood*

WILLIAM ALLAN
Charlotte, North Carolina

I was flattered by the invitation from your secretary to come here and take part in your program, and I came hoping to find the answer to a question that has puzzled me for some time. The question is this: Why do our young men learn nothing in the medical schools about the inheritance of diseases?

The longer I live, the more unpredictable this world seems. Thirty odd years ago I started at the bottom as a professor of bacteriology and parasitology, with a back yard full of kittens and guinea-pigs, studying amebic dysentery and typhus fever. Now, I have graduated into private practice and study people and their heredity, with a back yard full of assorted sizes of the genus homo (not yet sapiens, however), and am watching these little rascals develop a bewildering mixture of Scotch and Irish traits, their mother being an Irish girl. By way of illustration, I might say that the Irish fight from choice, the Scotch only as a matter of conscience, so that what the Irish start the Scotch have to finish. My gang may come home at sundown with a few black eyes in the spirit of "Onward Christian Soldiers," but by breakfast time they are humming that old Irish ballad:

"I've cleaned out the Finnigan faction,
I've licked all the Murphys afloat,
If you're out for a row or a ruction,
Just tread on the tail of me coat."

Since the days of Adam and Eve, the chance assortment of the genes has been the world's greatest lottery, and in comparison with it the Irish Sweepstakes or the Numbers Racket is merely a "crap game" up a side alley.

The public health movement in this country has always travelled along a single track, opening a single door, leading to the control of infectious disease. It seems to me high time that we opened another door in the public health field leading to the control of hereditary disease. I say this for three reasons. First, the proportion of persons who die from infectious diseases has dropped from two-thirds to one-third, leaving another third to die with chronic constitutional diseases, which are, in large part, inherited. Second, in the practice of medicine, limited to office and hospital work, I see about twice as many people with chronic constitutional diseases as with infectious diseases. Third, more than one half of our hospital beds are at all times filled with state patients, the mentally sick, the blind, the deaf and the orthopedic—and heredity is an important factor in filling state hospitals. Does it not seem strange that we should

*Read at the Forty-ninth Annual Meeting of the Association of American Medical Colleges held in Syracuse, New York, October 24-26, 1938.

go on breeding defectives and then try to salvage them or care for them without making any attempt to prevent their reproduction? Almost all men, including doctors, scout the very idea that human heredity can be controlled, but this shows what amateurs they are in the business of having and raising babies. The women are the important people in this field of preventative medicine, for they are intelligent, interested and cooperative.

Our major problems in heredity are, of course, cardiovascular disease, cancer and the mental diseases, but I shall not go off the deep end today by trying to discuss things we know too little about. Like every beginner, I did that some years ago.[1]

Today, I want to stay in shallow water, where it is not over my head, and discuss the control of some of the hereditary diseases that wreck childhood, —blindness, deafness and crippling. I do this for three reasons. First, the patterns of heredity in these childhood diseases have been worked out and are definitely known.[2] Second, these patterns are simple, usually dominant, sex linked recessive or simple recessive. Third, and most important, the fear of hereditarily defective children is a sufficiently strong motive to prevent their reproduction and to make a voluntary negative eugenics program (birth control) a welcome discipline in these families.[3]

Taking retinitis pigmentosa as an illustration of hereditary blindness, there are families in which this pathologic trait is inherited by each of the three usual simple patterns of inheritance. When dominant, vision begins to fail toward the end of the third decade, but complete blindness is rare, even in extreme old age; when sex linked recessive, the boys notice dimness of vision at about 20 years of age and are stone blind before 50; when recessive, blindness begins in the first decade and becomes total in the second.

Pedigrees of peroneal atrophy illustrate the three patterns of heredity and the same variation in severity and age of onset according to the mode of inheritance.

Pedigrees of muscular dystrophy illustrate both sex linked recessive and simple recessive heredity. In the former, the boys usually die before the reproductive age; in the latter, the children are hopelessly crippled in the second decade.

A pedigree of lobster claw hands and feet illustrates recessive heredity. In several instances this defective gene was lethal when first cousins in this family married.

A recessive pedigree of hereditary congenital deafness shows twenty-one children born deaf and dumb in three generations.

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1. Allan, W.: Heredity in Hypertension. Arch. Int. Med.; 52; 954 (Dec.), 1933.
2. Allen W.: Eugenical Significance of Retinitis Pigmentosa. Arch. Orhth.; 18; 938 (Dec.), 1937.
   Medicine's Need of Eugenics. South. M. & Surg. J.; 98; 416 (Aug.), 1936.
   Relation of Hereditary Pattern to Clinical Severity as Illustrated by Peroneal Atrophy. Arch. Int. Med. (to be published).
   Why Have Muscular Dystrophy? A Lethal and Unnecessary Gene. Trans. Asso. Amer. Phys. 1938 (To be published).
3. Allan, W.: The Relationship of Eugenics to Public Health. Eugenical News; 21; 73 (Aug.), 1936.

In the dominant pedigrees, if the pathologic trait is severe enough, those afflicted should have no children. In the sex linked recessive pedigrees, when the trait is not lethal, as in retinitis pigmentosa, both the afflicted boys and their sisters should not have children; when the trait is lethal before the boys reach reproductive age, as in muscular dystrophy, their sisters should not have children, as each carries a 50 per cent chance of having crippled sons. In the recessive patterns, the appearance of blindness and crippling is almost invariably due to cousin marriages, and the young people in families in which such traits are known to exist must be warned against marrying their kin; since the deaf, three times out of four, marry deaf partners, it is very necessary that those who inherit congenital deafness avoid marrying partners with the same hereditary trait.

I am often asked what makes me think that women want or will take any advice about what sort of children they are likely to have. I can only answer by saying that in my experience the women in these families are eager for eugenic advice. I will cite three illustrations. In securing the family history from a 30 year old girl who had lost three little brothers, one after another, from muscular dystrophy, I asked her how in the world her mother managed to nurse three little cripple boys. She replied: "There were eleven children in the family, and the six sisters took turn about dressing, feeding and nursing these little cripples and getting up at night to turn them over in bed after they became helpless." Is it any wonder that when this girl wanted to marry the next year, knowing her own chance of having crippled sons was 50 per cent, that she should come to me for birth control information?

In a neighboring county are three young men with muscular dystrophy; two are perfectly helpless, and the third is badly disabled but still at work at the age of 19. This youngest boy had married, and his wife was pregnant. They both asked that they be not allowed to pass this affliction on to their children. Since the trait in this family was sex linked recessive, the grandsons, not the sons, would have inherited the disaster, but a therapeutic abortion was promptly secured.

In another large family with sex linked recessive peroneal atrophy, one bride has asked for surgical sterilization, and several other young married women in the connection, sisters of the afflicted boys, have voluntarily asked for birth control information to keep them from having crippled sons.

To whom shall people go for eugenic advice? Manifestly, such advice should be given by the family physician. Why do physicians not advise afflicted families in their care about the control of these hereditary diseases? The answer is short and simple. They know nothing about heredity. Why do doctors know nothing about heredity? The answer is equally simple. They are taught nothing about heredity in the medical schools. Why is heredity not taught in the medical schools? Only the teachers can answer this question.

As a practitioner, it seems to me that in the medical curriculum genetics now deserves as much emphasis as bacteriology.

DISCUSSION

DR. C. SIDNEY BURWELL (Harvard University): It seems to me that in teaching it is extremely important to emphasize the recognition of diseases which can be cured or relieved. It is much more important to make a diagnosis of pernicious anemia or of tumor of the spinal cord than it is, for example, of lymphatic leukemia, for which no specific therapy exists. Similarly, the extraordinary examples Dr. Allan presented emphasize the importance of recognizing a condition that is perfectly specific and about which something can be done. Maybe it is the principle of the thing which should be emphasized in the medical school.

DR. S. I. KORNHAUSER (University of Louisville): I taught heredity in the undergraduate college and I try to teach it in the medical school. I think the one great difficulty in reaching the consciousness of students is that we try to teach this subject by lecturing instead of in the laboratory. If we would give them good laboratory work and have them raise four-legged Drosophila, or wingless ones, or defective ones of various types, I think they would remember it. We cannot accomplish this with lectures. Unfortunately, we hardly have time to give a good course in the medical school with laboratory work. I think we still must leave it to the professors of biology to give a good course with laboratory work and we should recommend it for premedical students.

Study of Applicants For Admission to the 1938 Freshman Class of Seventy-Seven Medical Colleges of the United States

Eleventh Study

FRED C. ZAPFFE
Secretary, Association of American Medical Colleges
Chicago, Illinios

In 1926, the Commission on Medical Education financed a study of applicants for admission to medical colleges of the United States. The study was made for four years when the Commission decided that inasmuch as its existence was to come to an end it could not longer support the study. The last study included the 1929 class. The study was not made for the years 1930 and 1931, but in 1932, the Association of American Medical Colleges decided that it was to be resumed and since that time it has been one of the many activities of the Association.

This study has given information which cannot be obtained any other way. While it entails considerable labor on the medical colleges which collaborate and on the office staff of the Association, it has proven definitely, on many occasions, that it has value, as colleges, which have had occasion to make use of the results and findings of the study, will be willing to give testimony. It is invaluable as a means to detect fraud and to give data on the number of applicants each year who seek admission to a medical college, the number of applications made by individual applicants, how many were accepted or rejected and the reasons for rejection. This study is the only means for securing this information. As will be shown in this report, the results for each year are at variance in many respects. The economics of the country are reflected in this study. The number of applicants has varied, in keeping with economic conditions, but the number of applications made by them has steadily increased, an indication, perhaps, of the increasing desire to study medicine and, also, of greater care in selection, mainly on the basis of scholarship and other factors entering into selection of students. Medical colleges, on the whole, are accepting fewer applicants; the students accepted are better prepared for the study of medicine, a fact which is well proven by the lower mortality of the freshman class as shown by the study of student accomplishment which this Association makes every year and which is published in the JOURNAL of the Association. Another study which should be consulted in this connection is the study which correlates the standing, by thirds, of students in the freshman class with their standing in the arts college, also published in the JOURNAL of the Association.

APPLICANTS AND APPLICATIONS

Table 1 presents a summary of number of applicants and applications, acceptances and rejections for both single and multiple applicants for six years from 1933 to 1938 inclusive. It presents interesting data. While the number

of applicants has remained fairly stationary, the number of applications made has increased steadily since 1933. In 1938, the number had increased by about 6,500, about 20 per cent, although the number of applicants was virtually the same, 12,131 as against 12,128. There were 5 per cent fewer applicants in 1938 than in 1934, which gave the highest number for all years—12,779. Another significant fact is that the number of single applicants—those who make only one application—has decreased to an astonishing degree—nearly 20 per cent—since 1933, whereas those who made more than one application—termed

TABLE 1—SUMMARY OF TOTALS OF APPLICANTS AND APPLICATIONS AND ACTION TAKEN: 1933, 1934, 1935, 1936, 1937 AND 1938

	1933	1934	1935	1936	1937	1938
No. Applications	29,705	32,321	34,427	35,439	34,416	36,268
No. Applicants	12,128	12,779	12,740	12,192	12,207	12,131
Single Applicants	7,269	7,623	7,231	6,657	6,564	6,249
Accepted	4,434	4,433	3,980	3,538	3,423	3,117
	60.9%	58.1%	55.4%	53.1%	52.1%	49.9%
Rejected	2,835	3,190	3,251	3,119	3,141	3,132
Multiple Applicants	4,859	5,156	5,509	5,535	5,643	5,882
Accepted	3,109	2,986	2,920	2,927	2,987	3,106
	63.1%	57.9%	53.0%	52.8%	52.9%	52.8%
Rejected	1,750	2,170	2,589	2,608	2,656	2,776
Applicants Accepted	7,543	7,419	6,900	6,465	6,410	6,223
	62.1%	57.9%	54.1%	53.0%	52.5%	51.3%
Applicants Rejected	4,585	5,360	5,840	5,727	5,797	5,908

multiple applicants—has increased correspondingly—20 per cent. It is easy to understand why the multiple applicants have increased in number, doubtless because of an insatiable desire to enter a medical school, but it is not so easy to account for the decrease in the number of single applicants. If this decrease had occurred in a period of two years only it might be accounted for by the fact that students are remaining in college longer than formerly, but a steady decrease over a period of six years cannot be accounted for by this explanation. Furthermore, a smaller percentage of single applicants is accepted than of the multiple applicants. Therefore, scholarship alone does not seem to play a part in arriving at an answer to the question why the number of single applicants is decreasing and that of the multiple applicants is increasing. True, some of the multiple applicants, who are fine students with high scholarship, are accepted by two or three colleges to which they apply, but the figures given in table 1 apply only to individuals, not to numbers of applications.

An evidence of better selection, based on many factors, such as scholarship and aptitude and other tests, is the decreasing percentage of acceptances in both the single and the multiple groups. In 1933, 60.9 per cent of single applicants were accepted; in 1938, 49.9 per cent, a difference of 11 per cent; in 1933, 63.1 per cent of multiple applicants were accepted; in 1938, 52.8 per cent, a difference of 10.3 per cent. The same decreasing percentage of acceptances of all applicants is noted, from 62.1 per cent in 1933 to 51.3 per cent in 1938. While most medical colleges have accepted fewer students since 1934, the number of

applicants has decreased; therefore it cannot be assumed that numbers have anything to do with the decrease in the numbers accepted. Selection is better than it was. Naturally, the increase in the number of multiple applicants accounts for the increase in the number of applications made by this group, 30,000 in 1938 as against 22,400 in 1933.

Judging by what has happened nearly every year for many years, less than 5,000 of the present freshman class will graduate. Nearly 1,000 will not go further than the first year for various reasons. Many will fail and be dropped; some find that they do not care for medicine; some become too ill to continue; a few, a very few, drop out to return to college; some are unable to finance themselves. Data on all of these items are given in the study of student accomplishment.

If it is true that economics, in general, plays a part in how many individuals seek professional vocations, then it must be assumed that business is better than it has been because when business is going downhill, attendance at colleges and professional schools goes up, and vice versa. If 1934 was a bad year for business, then 1938 must have been a fairly good year, on the whole. But that is not all of the answer. The present agitation and uncertainty concerning the practice of medicine may be a factor in accounting for the lessening of numbers of applicants, but this lessening is not of sufficient significance to be acceptable as support for the contention that poor business increases attendance in schools of higher learning, especially the professional schools. Perhaps, student advisors must be given credit for steering students away from medicine; or other fields of activity may have become more attractive than is medicine. There is no evidence in support of these suppositions, although they may be correct.

Do multiple applicants who have failed of acceptance apply again? Yes, some do, but the number is so small that it is of no significance. Rejection of numerous applications seems to act as a deterrent to making further application. Even those students who applied as a sort of "try out," to ascertain whether they would be accepted and who had no intention to quit college, are not a large group. Students seem to have made up their minds as to how long they will remain in college and apply for admission to a medical school at the termination of that period. Very little "shopping" is done in that respect. The multiple applicants do quite a bit of "shopping," as did the one student who applied to 43 medical schools and finally gained an acceptance.

Doubtless, it may be accepted as a truism that better selection will make for better practitioners, particularly because from 22 to 25 per cent of all entrants fail of graduation, an elimination of the unfit. That state of affairs is full of high hopes for the future welfare of all of the people, both the well and the sick.

WOMEN APPLICANTS

Table 2 presents the data on the women applicants. Women seem to regard medicine highly as a field of activity, and they are making greater effort to enter that field. Since 1933, the number of women applicants has increased by about 26 per cent and the number of applications made by them has increased by 48

per cent. In numbers, this means, in 1933, 507 applicants made 833 applications; in 1938, 642 applicants made 1,491 applications. As in the case of the men, higher figures are noted for 1934 and 1935. Since then, there has been a steady falling off and the figures for 1938 are fairly comparable, in most instances to those of 1933, except in the case of the women applicants, as stated above.

TABLE 2—SUMMARY OF TOTALS OF WOMEN APPLICANTS AND APPLICATIONS AND ACTION TAKEN

	1933	1934	1935	1936	1937	1938
No. Applications	833	1,034	1,443	1,384	1,397	1,491
No. Applicants	507	636	689	659	649	642
Single Applicants	355	458	439	411	398	354
Accepted	200	262	230	216	209	165
	56.5%	57.2%	54.7%	52.5%	52.3%	46.6%
Rejected	155	196	209	195	89	189
Multiple Applicants	152	178	250	248	251	288
Accepted	116	122	149	157	132	157
	76.3%	68.5%	59.6%	63.3%	52.6%	54.5%
Rejected	36	56	101	91	119	131
Applicants Accepted	316	384	379	373	341	322
	62.3%	60.4%	55.0%	56.6%	52.4%	50.0%
Applicants Rejected	191	252	290	286	308	320

The acceptances for women applicants have decreased from 62.3 per cent in 1933 to 50 per cent in 1938. As in the case of the men, there were many more multiple applicants, an increase of nearly 100 per cent. The number of single applicants was about the same, one less in 1938 than in 1933. The acceptances of single applicants have fallen off nearly 10 per cent; of multiple applicants, nearly 22 per cent! It is possible that women have been stimulated to enter medicine by the fact that more colleges now accept women than formerly, which may make it possible, for financial reasons, for a woman to attend a college located in a community where the cost of living is not as high as it is in larger centers of population, or a college located in or very near her home town thus making it possible for her to live at home. These are merely suppositions. There are no facts at hand to support these guesses and make them more than just that. One fact does stand out: the number of women medical students is not increasing very much.

ACCEPTANCE ON BASIS OF PREPARATION

There is today, as there always has been, much discussion as to how long should be the preparation for the study of medicine. Some medical educators (their number is increasing) maintain that three years of college work should be the minimum; others would have it a bachelor's degree although such a degree, on the face of it, does not necessarily have the value which it may be supposed to have. The basis on which it is granted must be investigated carefully if its actual value is to be appraised. Then there are those outside of the medical profession who claim that there is discrimination in the selection of students based on the length of their preparation for the study of medicine. The

study on student accomplishment in medical school throws many interesting lights on how students with the minimum of preparation fare in contrast with those who have more, even a bachelor's degree. Table 3 is an answer to those who claim discrimination.

TABLE 3—DATA ON ACCEPTANCES ACCORDING TO YEARS OF COLLEGE WORK

1938	Single Applicants		Multiple Applicants		
	Accepted	Rejected	Accepted	Rejected	Totals
2-3 years	360	272	80	97	809
3-4 years	1122	731	581	544	2978
4 or more yrs.	199	283	169	240	841
A.B. Degree	780	582	1259	987	3608
B.S. Degree	596	587	1007	858	3048
Other degrees	23	33	8	10	74
Not Stated	37	694	2	40	773
Totals	3117	3132	3106	2776	12,131

In 1938, only 6.6 per cent of the applicants for admission had less than three years of college work. Of that group, 54.4 per cent were accepted, which speaks well for their scholarship and aptitude for medical work. The acceptance of this group has been justified every year by the accomplishment during the freshman year—and subsequently. The three to four years group constituted 24.5 per cent of the applicants; 56.7 per cent were accepted. The A.B. group constituted 29.7 per cent of the applicants; 56.5 per cent were accepted. The B.S. group constituted 25.1 per cent of the applicants; 52.6 per cent were selected. A hazardous group is the one composed of applicants who have been in college for four or more years but who have not received a degree. True, some of these students may have been in attendance at college irregularly. They may have taken isolated courses, without a definite objective in mind. The study of student accomplishment has shown that they do badly in medical school, probably because of the "shuffle" of courses taken. In 1938, that group constituted 6.9 per cent of the applicants; only 45 per cent were accepted. It will show the greatest mortality at the end of the year.

Another group which appears in the table is the one composed of applicants whose degree of preparation was not stated on the card. Although that group represented 6.3 per cent of all applicants, only 5 per cent were accepted. The failure to state preparation doubtless was an oversight. The "other degrees" represent unusual degress which could not be classified as A.B. or B.S. or ensuing degrees. It was a very small group of which 42 per cent of the applicants were accepted.

It must be remembered that rejection may be based on several points. For instance, the class is full; i.e., the college has accepted its quota or a sufficient number of applicants to ensure that the desired number of students will matriculate (see Table 4). Some schools set up a waiting list from that group because the credentials and other desiderata which enter into selection are satisfactory. The "class full" item on the application card calls for "acceptable credentials."

Refusal to accept for this reason, therefore, cannot be regarded as a black mark against an applicant.

Then there is the rejection based on inadequate credentials; i.e., the credentials are not sufficient in quantity to meet the requirements for admission of the college. A college with lower requirements might have accepted such an applicant. Only about 3 per cent of all applicants fall into this classification. Rejection based on poor scholarship or personality concerns the largest number of applicants. About 30 per cent of all applicants were rejected for this reason. But, here, again, the requirements of the college may reject an applicant who may be acceptable to a college with lower requirements. Some colleges accept only A and B students; some accept as low as C students. If the student has attended the main university of which the medical school is a part, it is possible to make a better adjudication of his ability, his aptitude for the study of medicine than can be done for a student who comes from some other university or college. This will account for the acceptance of some C students. Then, again, certain state university medical schools will not accept a nonresident who is not, at least, a B plus student. This ruling also leads to the rejection of students who are acceptable to other schools.

As everyone knows, every year a considerable number of students fail of promotion because of poor accomplishment. These students often try to be admitted by another medical school. Most of that group are not admitted by any medical school. Some schools do accept them. Therefore, that is an item for rejection on the application card. This group is a comparatively small one as most failed or dropped students do not try to go any further. Those applying represent about 0.5 per cent of all applicants. Some failed students, a very few, return to college for further preparation.

It is also interesting to note the reason for rejection for the items mentioned above as based on the degree of preparation. The item "class full" is not considered in this connection. The rejection for quantitative inadequacy of credentials naturally is greatest among the less than three years group because only a very few colleges choose their students from this group despite the fact that published requirements may be the minimum for admission—two years of college work. This is also true of some colleges which select only students holding a bachelor's degree, or better, although their published requirements are three years of college work. But applicants soon get to know that, hence will not apply to a school which they are convinced will not accept any applicant who does not hold a degree. As a matter of fact, only two medical colleges have a degree requirement, with certain specifications, for admission. Three or four other colleges select only degree holders. The figures on the numbers of matriculants for the 1938-1939 session and the degree of their preparation has been published in a preceding issue of the JOURNAL. They show that only 4 per cent of the present freshman class of all medical colleges in the United States had less than three years of preparation and that more than 60 per cent had a degree.

Taking the reasons for rejection based on scholarship and inadequate (quantitatively) credentials in order: 1. inadequate credentials; 2, poor scholarship or personality; 3, failed in another medical school—the figures for each group are as follows: Two to 3 years group—1, 39 per cent; 2, 59 per cent; 3, 2 per cent. Three to 4 years group—1, 16.8 per cent; 2, 81.7 per cent; 3, 1.5 per cent. Four or more years group—1. 7 per cent; 2, 91.0 per cent; 3, 2 per cent. A.B. group—1, 7.5 per cent; 2, 90 per cent; 3, 2.5 per cent. B.S. group—1, 8.0 per cent; 2, 90 per cent; 3, 2 per cent. These figures show definitely that the degree of itself is not an indication of good scholarship and that fewer rejections are based on poor scholarship in the nondegree group than in the degree group. Of course, these figures are not new but they are confirmatory.

Table 4, aside from the information to be derived from it, is convincing evidence that passing on applications is an enormous job for many medical schools. Furthermore, many applications are received on which no action is taken because it is useless to evaluate credentials after the quota set by the college has been filled. All such applications are checked on the application card as "no action taken." These figures are not considered in this connection. Seven colleges considered more than 1,000 applications; the highest number being 1,393 of which 214 were accepted. Five schools reported less than 100 applications. Some state schools will not consider the application of a nonresident, hence the number of applications reported by these schools is small, especially the two year schools whose classes are quite small. One school accepts only applicants who are members of a religious group which operates the school, hence the number of applications received by that school is small. Some schools accept a considerably larger number of applications than will be represented by matriculants, which, surely, must entail a great deal of office work. Fewer applicants were accepted in 1938 than in preceding years; about 12 per cent less than matriculated in 1934. And, not all accepted students matriculate, although this year the number not matriculating is smaller than in previous years. The fourth column in table 4 gives the numbers of students who enrolled in each medical school last fall. The total is 5,582. It does not include all repeaters of whom there are, usually, about 200. The total number of applicants accepted was 6,223; 541 accepted applicants did not matriculate. Why? Some may have suffered a sudden shortage of funds to finance their course; others may have been disappointed in getting funds; others may have returned to college; some students may have made application with no intention of enrolling this year—a sort of "try-out" to see whether it could be done. Of the number enrolled, probably not more than 5,000 will be promoted to the sophomore year. This is the smallest class in years.

MULTIPLE APPLICANTS

There were 5,882 multiple applicants. They made 30,000 applications, an average of nearly six applications per applicant. One third made two applications each; one fifth made three applications each; one eighth made four applications each; one eleventh made five applications each. In other words, 4,248

TABLE 4—DATA BY COLLEGES ON TOTAL NUMBER OF APPLICATIONS MADE AND ACCEPTANCES AND REJECTIONS (MEN AND WOMEN)

	Applications			Students
	Accepted	Rejected	Total	Enrolled
Alabama	59	424	483	53
Arkansas	77	51	128	68
College Medical Evangelists	75	100	175	75
California	63	242	305	63
Southern California	65	258	323	54
Stanford	86	249	335	62
Colorado	54	42	96	54
Yale	91	454	545	55
Georgetown	135	498	633	96
George Washington	88	435	523	75
Howard	49	230	279	39
Emory	64	188	252	59
Georgia	59	53	112	48
Chicago Medical	94	*	94	53
University of Chicago	174	794	968	96
Illinois	144	217	361	156**
Loyola	100	399	499	67
Northwestern	214	1179	1393	122
Indiana	129	910	1039	122
Iowa	55	65	117	55
Kansas	106	241	347	97
Louisville	150	638	788	89
Louisiana	181	138	319	111
Tulane	223	251	474	124
Johns Hopkins	95	294	389	71
Maryland	118	361	479	95
Boston	96	294	390	57
Harvard	152	696	848	124
Tufts	133	255	388	100
Michigan	153	546	699	113
Wayne	65	181	236	65
Minnesota	112	232	344	99
Mississippi	25	19	44	24
Missouri	48	42	90	35
St. Louis	187	1022	1209	114
Washington	108	610	718	75
Creighton	136	193	329	61
Nebraska	111	74	185	87
Dartmouth	22	135	157	22
Albany	40	466	506	34
Buffalo	94	510	604	74
Columbia	125	899	1024	106
Cornell (New York)	80	846	926	80
Long Island	131	702	833	95
New York Medical	85	732	782	83
New York University	137	750	878	137
Rochester	77	466	543	52
Syracuse	48	458	506	47
Duke	93	494	587	68
North Carolina	41	118	159	41
Wake Forest	37	78	115	32
North Dakota	27	321	348	26
Cincinnati	112	452	564	78
Ohio	78	221	299	78
Western Reserve	125	696	821	71

*Number of rejected applications not stated.
**Twelve acceptances are holdovers from 1937.

TABLE 4—Continued

	Applications Accepted	Applications Rejected	Total	Students Enrolled
Oklahoma	69	199	268	66
Oregon	80	336	416	67
Hahnemann	315	696	1011	153
Jefferson	176	562	738	133
Pennsylvania	178	1059	1237	118
Pittsburgh	91	245	336	80
Temple	126	1091	1217	105
Woman's Medical	44	103	147	29
South Carolina	42	547	589	42
South Dakota	41	51	92	26
Meharry	62	53	115	62
Tennessee	154	233	387	89
Vanderbilt	53	652	705	51
Baylor	98	117	215	80
Texas	101	60	160	101
Utah	51	58	109	30
Vermont	34	32	66	32
Med. Coll. of Virginia	118	495	613	80
University of Virginia	85	332	417	66
West Virginia	38	87	125	30
Marquette	131	432	563	88
Wisconsin	77	78	155	74

applicants made 12,670 applications, the highest number per applicant being five applications. From 6 to 10 applications were made by 7,860 applicants, an average of nearly 8 applications per applicant. More than 10 applications were made by 590 applicants, the highest number for one applicant being 43. These 590 applicants made a total of 9,485 applications, an average of about 19 applications per applicant.

Table 5 gives the details as to acceptances. Every applicant had one or more acceptances except the one man who made 31 applications, the two men who made 32 applications each, the man who made 33 applications; 2 men who made 34 applications, one who made 39 applications. Some multiple applicants try again, one did for three successive years, and still fail of acceptance. Figures are not available to show how many continue to try for acceptance, although the cards for each year could be consulted—a tremendous piece of work for which there does not seem to be justification. (For details of acceptance of multiple applicants, see table 1).

GEOGRAPHIC DISTRIBUTION OF APPLICANTS

Table 6 gives the numbers of applicants for each state and fifty-five foreign countries. As is to be expected, the states with the largest population supply the largest number of applicants. New York State, with about one-tenth of the population of the United States, supplied 16.6 per cent of the applicants; Pennsylvania, with about one-thirteenth of the total population, supplied about 8.5 per cent of the applicants. In other words, these two states, with about one-sixth of the total population, supplied about 25 per cent of the applicants. The first eleven states named in table 6 are in the same order as they were in 1937.

TABLE 5—DATA ON 5,882 MULTIPLE APPLICANTS
NUMBER OF APPLICATIONS MADE, ACCEPTANCES AND REJECTIONS

1819 made 2 applications — 3638
824 had no acceptances
995 had 1227 acceptances
1 acc—763
2 acc—232

1187 made 3 applications — 3561
513 had no acceptances
674 had 923 acceptances
1 acc—467
2 acc—165
3 acc— 42

739 made 4 applications — 2956
315 had no acceptances
424 had 557 acceptances
1 acc—247
2 acc—129
3 acc— 40
4 acc— 8

503 made 5 applications — 2515
207 had no acceptances
296 had 471 acceptances
1 acc—168
2 acc— 89
3 acc— 32
4 acc— 6
5 acc— 1

342 made 6 applications — 2052
159 had no acceptances
183 had 274 acceptances
1 acc—121
2 acc— 42
3 acc— 12
4 acc— 7
5 acc— 1

246 made 7 applications — 1722
120 had no acceptances
126 had 191 acceptances
1 acc— 82
2 acc— 27
3 acc— 15
4 acc— 1
6 acc— 1

185 made 8 applications — 1480
93 had no acceptances
92 had 149 acceptances
1 acc— 55
2 acc— 24
3 acc— 8
4 acc— 3
5 acc— 2

144 made 9 applications — 1296
83 had no acceptances
61 had 88 acceptances
1 acc— 42
2 acc— 12
3 acc— 6
4 acc— 1

131 made 10 applications — 1310
71 had no acceptances
60 had 88 acceptances
1 acc— 40
2 acc— 14
3 acc— 4
4 acc— 2

96 made 11 applications — 1056
54 had no acceptances
42 had 70 acceptances
1 acc— 26
2 acc— 10
3 acc— 4
4 acc— 1
8 acc— 1

88 made 12 applications — 1056
54 had no acceptances
34 had 46 acceptances
1 acc— 26
2 acc— 6
3 acc— 1
5 acc— 1

70 made 13 applications — 910
54 had no acceptances
16 had 24 acceptances
1 acc— 10
2 acc— 4
3 acc— 2

57 made 14 applications — 798
39 had no acceptances
18 had 26 acceptances
1 acc— 13
2 acc— 3
3 acc— 1
4 acc— 1

48 made 15 application — 720
34 had no acceptances
14 had 26 acceptances
1 acc— 7
2 acc— 6
7 acc— 1

36 made 16 applications — 576
25 had no acceptances
11 had 13 acceptances
1 acc— 9
2 acc— 2

28 made 17 applications — 476
22 had no acceptances
6 had 9 acceptances
1 acc— 4
2 acc— 1
3 acc— 1

27 made 18 applications — 486
19 had no acceptances
8 had 11 acceptances
1 acc— 6
2 acc— 1
4 acc— 1

12 made 19 applications	228
7 had no acceptances	
5 had 5 acceptances	
1 acc— 5	
15 made 20 applications	300
12 had no acceptances	
3 had 3 acceptances	
1 acc— 3	
14 made 21 applications	294
8 had no acceptances	
6 had 7 acceptances	
1 acc— 5	
2 acc— 1	
21 made 22 applications	462
18 had no acceptances	
3 had 3 acceptances	
1 acc— 3	
8 made 23 applications	184
6 had no acceptances	
2 had 7 acceptances	
2 acc— 1	
5 acc— 1	
7 made 24 applications	168
6 had no acceptances	
1 had 2 acceptances	
9 made 25 applications	225
7 had no acceptances	
2 had 2 acceptances	
1 acc— 2	
7 made 26 applications	182
6 had no acceptances	
1 had 2 acceptances	
12 made 27 applications	324
9 had no acceptances	
3 had 3 acceptances	
1 acc— 3	
5 made 28 applications	140
4 had no acceptances	
1 had 1 acceptance	
4 made 29 applications	116
3 had no acceptances	
1 had 1 acceptance	
4 made 30 applications	120
3 had no acceptances	
1 had 3 acceptances	
1 made 31 applications	31
No acceptances	
2 made 32 applications	64
2 had no acceptances	
1 made 33 applications	33
No acceptances	
2 made 34 applications	68
No acceptances	
1 made 35 applications	35
1 acc— 1	
3 made 37 applications	111
2 had no acceptances	
1 had 1 acceptance	
2 made 38 applications	76
1 had no acceptance	
1 had 1 acceptance	
1 made 39 applications	39
No acceptances	
2 made 40 applications	80
1 had no acceptances	
1 had 1 acceptance	
2 made 42 applications	84
1 had no acceptances	
1 had 2 acceptances	
1 made 43 applications	43
1 acc— 1	

About 61.4 per cent of the applicants came from these eleven states whose total population is about 70,000,000, a proportionate ratio between applicants and population.

In 1938, 19 foreign countries were represented by 55 applicants. Of course, these countries were the birthplace of the applicants. Whether they came to this country for the purpose of studying medicine or whether they are now residents cannot be determined from the application card, but doubtless it can be assumed that they are now residents although they may not be citizens. This is merely a statistical fact, one which is without significance. In fact, table 6 has only statistical value. No conclusions of value or having any bearing on the study, as a whole, can be drawn. It is submitted for the purpose of completing the information which this study has disclosed and to make it possible for the inquiring mind, which is seeking these facts, to find them available and based on a reliable source. Factual knowledge has value.

TABLE 6—GEOGRAPHIC DISTRIBUTION OF ALL APPLICANTS

	Single Applicants	Multiple Applicants	Total
New York	693	1324	2017
Pennsylvania	443	592	1035
California	363	365	728
Illinois	434	278	712
Ohio	293	336	629
New Jersey	180	398	578
Massachusetts	144	276	420
Texas	260	130	390
Michigan	209	160	369
Indiana	230	81	311
Wisconsin	162	97	259
Minnesota	194	64	258
North Carolina	127	94	221
Georgia	134	84	218
Tennessee	151	54	205
Missouri	125	79	204
Virginia	146	57	203
Kansas	141	55	196
Connecticut	75	113	188
Oklahoma	119	56	175
Iowa	126	46	172
Washington	65	104	169
Louisiana	139	29	168
Kentucky	80	86	166
Nebraska	104	43	147
South Carolina	79	67	146
West Virginia	73	71	144
Alabama	79	58	137
Maryland	76	60	136
Florida	56	63	119
Mississippi	75	43	118
District of Columbia	75	35	110
Oregon	67	39	106
Utah	50	45	95
Colorado	60	34	94
Arkansas	74	17	91
Puerto Rico	36	52	88
Rhode Island	20	46	66
South Dakota	39	23	62
Vermont	47	10	57
North Dakota	19	31	50
Montana	11	36	47
Maine	21	21	42
Idaho	17	23	40
New Hampshire	21	13	34
Hawaii	13	19	32
Arizona	14	17	31
Canada	22	8	30
Wyoming	6	14	20
New Mexico	8	8	16
Delaware	4	12	16
Nevada	1	10	11
China	9	1	10
Panama	2	5	7
Cuba	2	4	6
Central America	3	2	5

TABLE 6—(Continued)

	Single Applicants	Multiple Applicants	Total
British West Indies	4		4
India	3		3
Alaska	1	2	3
Japan	2	1	3
Philippine Islands	1	2	3
Germany	2		2
Mexico	1		1
Egypt		1	1
Nicaragua	1		1
South America	1		1
Turkey	1		1
Italy	1		1
Australia	1		1
Poland	1		1
Switzerland	1		1

This study represents a tremendous amount of work done over a period of months. It gives information which will or which may have value for educators and those who wish to have a reliable basis for statements of fact. For them, it is the only available source of such information. To these and any others who may have a casual interest in the data presented the study is submitted for whatever it may be worth to them.

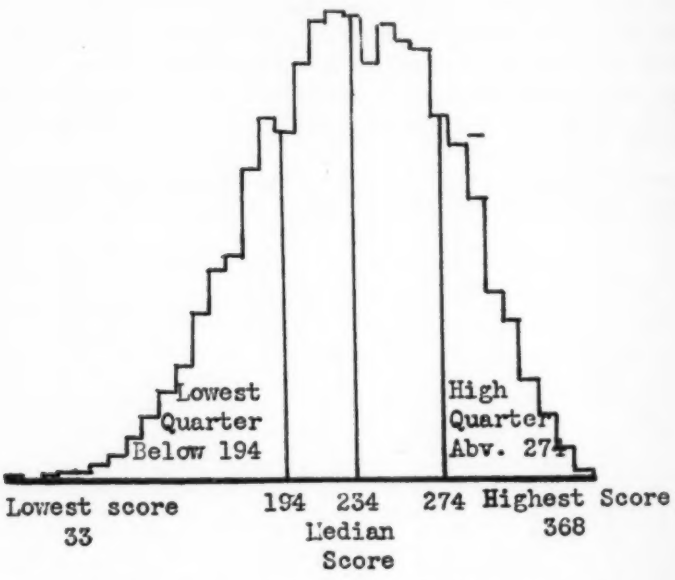
Grateful acknowledgement is made to the colleges which so kindly and patiently furnished the information which forms the basis of this study.

Report of the Committee on Aptitude Tests For Medical Schools

F. A. Moss
Director of Study
Washington, D. C.

I. *The Test of December 3, 1937.*—On December 3, 1937, Form 10 of the medical aptitude test was administered to 10,367 students in 625 premedical schools throughout the United States and Canada. The form of the test devised for these 1938 applicants contained a preliminary study sheet which had not been used in Forms 8 and 9. The seven separate tests making up the form were:

Chart 1.—Total Distribution of All Total Scores
(Form 10)



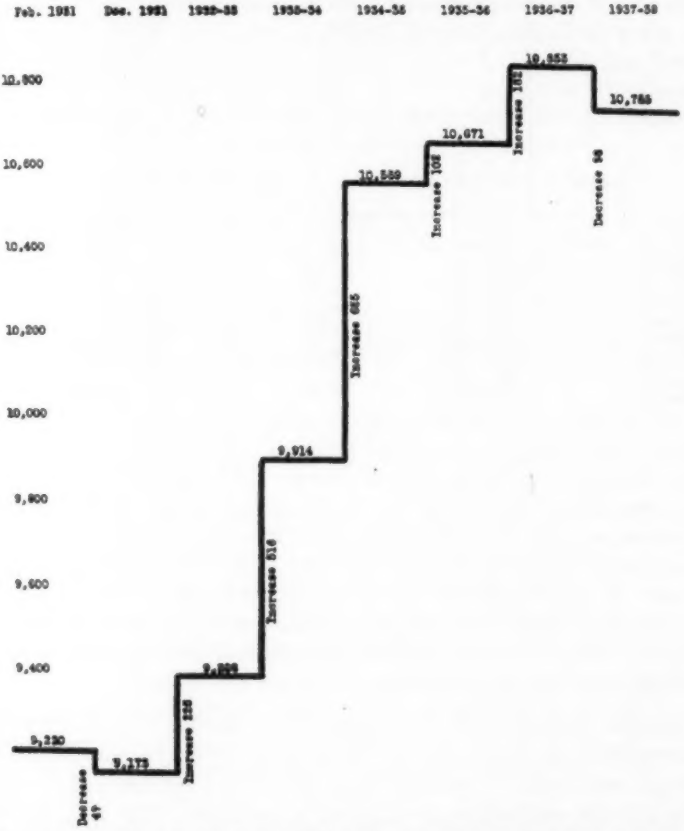
(1) Comprehension and Retention; (2) Visual Memory; (3) Memory for Content; (4) General Information; (5) Logical Reasoning; (6) Scientific Vocabulary and (7) Understanding of Printed Material. The first three tests were learning tests based on material found in the preliminary sheet.

The total scores on this form ranged from 33 to 368 out of a possible score of 395. The median total score was 234, one-half of those taking the test falling above this and one-half below. On total score, the highest quarter made above 274, the lowest quarter below 194. The distribution of all total scores on Form 10 is shown in Chart 1.

TABLE 1—DISTRIBUTION OF NUMBER TAKING TEST BY STATES

State	Number	State	Number	State	Number
Alabama	172	Maryland	187	Pennsylvania	1,079
Arizona	26	Massachusetts	423	Rhode Island	64
Arkansas	72	Michigan	380	South Carolina	128
California	653	Minnesota	245	South Dakota	32
Colorado	101	Mississippi	104	Tennessee	252
Connecticut	111	Missouri	206	Texas	471
Delaware	5	Montana	31	Utah	96
District of Columbia	143	Nebraska	158	Vermont	75
Florida	68	Nevada	13	Virginia	285
Georgia	201	New Hampshire	85	Washington	121
Idaho	33	New Jersey	112	West Virginia	135
Illinois	391	New Mexico	21	Wisconsin	179
Indiana	328	New York	1,279	Wyoming	15
Iowa	152	North Carolina	250	Canada	329
Kansas	172	North Dakota	34	Puerto Rico	26
Kentucky	168	Ohio	599	Hawaii	16
Louisiana	177	Oklahoma	197	Canal Zone	2
Maine	46	Oregon	97		

Chart 2.—Number of Students Taking Test by Years



A report showing the ratings of all students tested on December 3rd, with tables for interpretation of the scores was sent to the admission officers of the medical schools on January 24, 1938.

Supplementary Test of April 9, 1938.—In accordance with a plan devised by our Committee for taking care of supplementary examinations, a new form of the test, Form 11, was constructed, and on April 9, 1938, it was administered in 60 centers throughout the country to 282 students who for one reason or another had not been able to take the test in December. This form contained the following separate tests: (1) General Information; (2) Scientific Vocabulary; (3) Spelling; (4) Logical Reasoning; (5) Understanding of Printed Material. The total score possible on this form was 380. The scores made by the students ranged from 83 to 355. The median score was 241; the highest quarter made above 281; the lowest quarter, below 199.

Since April 9, we have given 106 tests which gives a total of 10,755 tests administered during the fiscal year 1937-1938.

Number of Students Taking the Test by Years.—From 1931 through 1937 there was a steady increase in the number of tests given each year, as shown in Chart 2 and Table 2. For the fiscal year just ended, however, there was a decrease of 98 as compared with the number given the previous year. This is due, largely, to restrictions placed on the administering of supplementary tests.

TABLE 2—SUMMARY OF NUMBER OF TESTS GIVEN SINCE 1928

Form	Date	Number of Tests	Number of Schools
Form 1	1928-1929	1,552	In Medical Schools
Form 2	1929-1930	5,916	In Medical Schools
Form 3	Feb. 1931	9,220	547 premedical schools
Form 4	Dec. 1931	9,173	537 premedical schools
Form 5	Dec. 1932	9,398	546 premedical schools
Form 6	Dec. 1933	9,976	636 premedical schools
Form 7	Dec. 1934	10,569	615 premedical schools
Form 8	Dec. 1935	10,671	624 premedical schools
Form 9	Dec. 1936	10,853	627 premedical schools
Form 10	Dec. 1937	10,755	628 premedical schools
Form 11	Apr. 1938		

Use Made of the Test by Medical Schools: Percentage of Classes Tested.—The increasing use made of the test by the medical schools in the selection of their classes is shown by the fact that each year a larger percentage of students admitted have test scores. Only 67 per cent of the 1931-1932 freshman class had taken the medical aptitude test as compared with 86 per cent of the 1937-1938 class. More than 90 per cent of the students in thirty-one of the 1937-1938 classes had been tested, and several schools showed 100 per cent. With this increasing use of the test, the number of failures has declined.

Percentile Ranking of Students Admitted to Medical School (Fall 1937) Compared With the Entire Group of Applicants Tested.—A further indication of the use made of the test is shown by a comparison of the aptitude test ratings of the students admitted to the 1937-1938 freshman classes with the entire group who took Form 9 in December, 1936. From the figures in Table 3, it is apparent that students who make high scores on the test are admitted to medical school in larger numbers than those making low scores.

Prediction of Medical School Grades (Freshman 1937-38) by Aptitude Test Scores.—How well the test predicted the success of students in the 1937-

Chart 3.—Percentage of Freshman Classes Having Aptitude Test Scores

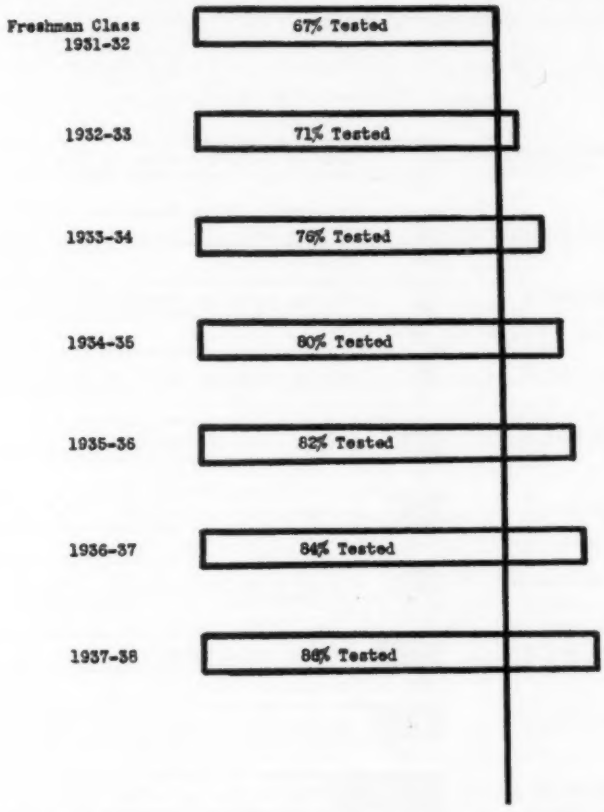


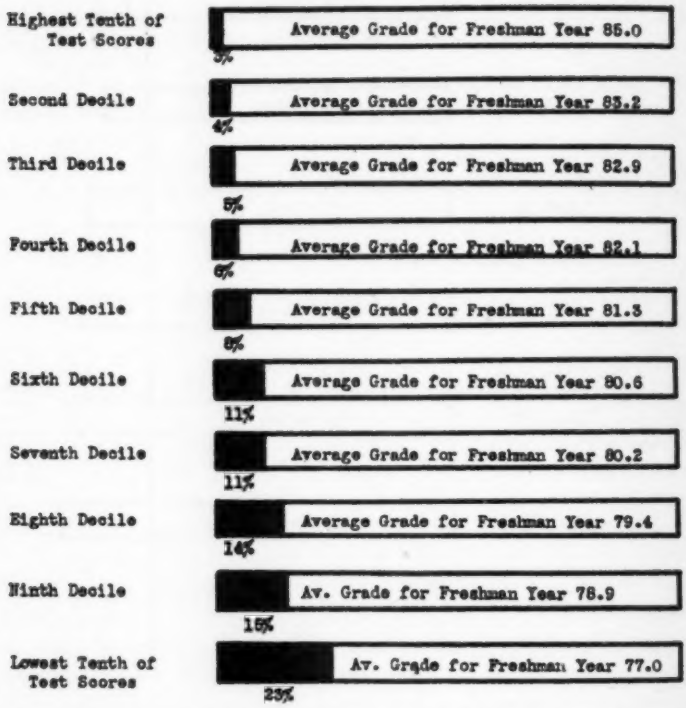
TABLE 3—COMPARISON OF APTITUDE TEST SCORES OF STUDENTS ADMITTED (FALL 1937) WITH THOSE OF TOTAL GROUP OF APPLICANTS TESTED

	All Applicants	Students Admitted
Highest 10 per cent made score above	319	324
Highest quarter made score above	294	301
Median Score was	260	270
Lowest quarter made score below	221	235
Lowest 10 per cent made score below	185	204

1938 freshman classes is illustrated in Chart 4. In this chart the students were divided into ten equal groups on the basis of their score on the aptitude test. Each bar shows the medical school average at the end of the first year for one-tenth of the group.

It will be noted that in the highest tenth of test scores, the average freshman grade is 85.0, 13 per cent average above 90, and only 3 per cent fail. Contrasting this with the lowest tenth, we find 23 per cent failing the first year and the average grade for the group is only 77. We find, as in the case of earlier studies, a gradual decline in the average grade in medical school from the high tenth to the low tenth. In every instance, too, the percentage of failures increases as test scores decrease.

Chart 4.—Medical School Performance at Various Test Score Levels
Freshmen, 1937-1938



II. *Comparative Study of Aptitude Test and Premedical Grades in Selecting Medical Students in Two Schools.*—In the past it has been found that the best criterion for selecting students is a combination of college grades, test scores, personality ratings, letters of recommendation, etc. This year we decided to investigate the feasibility of adding a fourth criterion in the form of high school grades. Before doing it on a wide scale, we decided to make a special study of the predictive value of high school grades in two medical schools, namely the University of Maryland and George Washington University. For the students in the freshman medical class in these two schools we obtained college grades, high school grades, test scores, and first year medical averages.

Table 4 indicates the value of each of these three criteria in predicting the performance of the highest and lowest three-tenths of the first year medical class in School A. We divided the class into high and low three-tenths on the basis of: (1) aptitude test scores, (2) college grades, and (3) high school grades, and contrasted the performance of the high and low group on the basis of each criterion. It will be noted from Table 4, that the best prediction was obtained by the test scores. When divided on the basis of test scores, there are no grades below 80 in the upper three-tenths, and 23 per cent of the group average 90 or above; whereas in the low three tenths, 30 per cent failed and none obtained an average as high as 85.

TABLE 4—RELATIONSHIP BETWEEN FIRST YEAR MEDICAL GRADES AND VARIOUS CRITERIA IN SCHOOL A

First Year Medical Grades and Test Scores	F	75-79	80-84	85-89	90-up
High Three-Tenths			22.7%	54.5%	22.7%
Low Three-Tenths	30.4%	26.0%	43.4%		

First Year Medical Grades and College Grades	F	75-79	80-84	85-89	90-up
High Three-Tenths		21.7%	30.4%	30.4%	17.3%
Low Three-Tenths	27.5%	24.1%	37.9%	10.3%	

First Year Medical Grades and High School Grades	F	75-79	80-84	85-89	90-up
High Three-Tenths	15.3%	19.2%	28.0%	34.7%	11.5%
Low Three-Tenths	3.8%	23.0%	42.3%	26.9%	3.8%

While there is a definitely positive relation between college grades and success in freshman medical work in this school, they do not, in most schools, predict as accurately as do the test scores. When the class is divided on the basis of college grades, there are no failures in the upper group and none of the students in the low group made averages as high as 90. However, 22 per cent of the high group average as low as the 75-79 group and 10 per cent of the low group obtained grades between 85 and 89.

The high school grades show a positive correlation with the first year medical grades of only .08, which indicates practically no relationship.

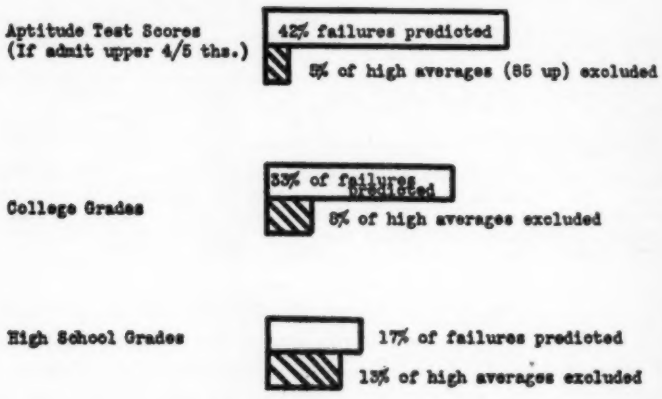
Relative Efficiency of These Three Criteria in Predicting Failures.—Let us now consider the relative efficiency of the three criteria in predicting failures and also the percentage of high averages which each would have excluded in these two schools. Let us suppose that the lowest fifth of each criterion had been denied admission. By such a test score criterion, 42 per cent of the failures in these two classes would have been eliminated. By refusing admission to the lowest fifth on the basis of college averages, 33 per cent of the failures would have been eliminated. By the same procedure in the case of high school grades, 17 per cent of the failures would have been excluded.

It is of further importance to notice the percentage of good students who would also be eliminated; for a criterion could not be called efficient, even if it eliminated failures, if at the same time it also eliminated a number of good

students. It will be noted from Chart 5 that fewer high averages would have been eliminated by refusing admittance to the lowest fifth of test scores than if the same procedure were followed in a selection based on either college or high school grades.

Thus, it would appear from the study in these two schools that very little would be gained by considering the high schools as an additional criterion. The unreliability of the high school grades is probably due to the fact that there were so many teachers with varying standards for grading who assigned the high school grades, and once again we find that the best criterion is a combined

Chart 5.—Efficiency of Three Criteria for Selecting Medical Students in Two Freshman Classes (1937-1938)



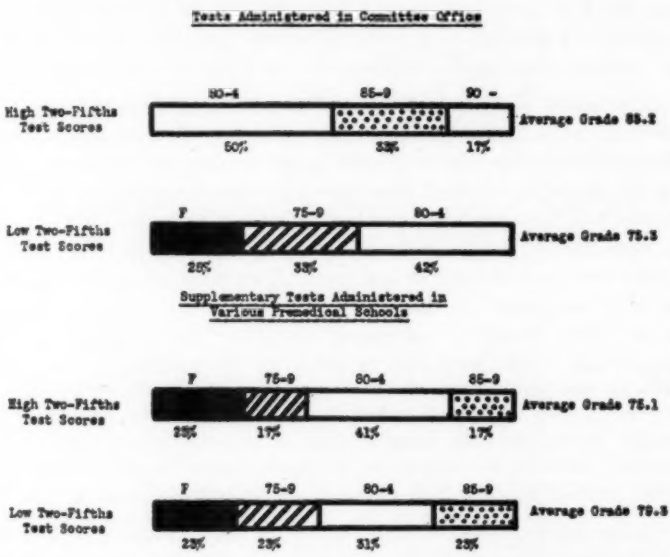
one based on premedical college grades and test scores. In most schools the test scores have a slightly higher predictive value than the premedical grades, there are some, however, where the premedical grades are better than the test score, but in practically all instances a combined criterion of the two is more reliable than either alone.

III. *Supplementary Tests.*—For several years our Committee has been quite concerned with the problem of supplementary tests. Each year several hundred students who failed to take the test at the regular time in December apply for admission to a medical school, and, at the request of the admission officers, are allowed to take a special test, usually in their own premedical school. Each year in comparing the test scores with grades in medical school we find that these supplementary tests constitute a large percentage of our discrepant cases. This is especially noticeable in medical schools which admit a number of students who have taken these special tests. There is a further tendency for the predictive value of the tests to decrease in proportion to the number of examiners who administer these supplementary tests. To illustrate: If a medical school admits twelve students who have taken special tests administered by different

examiners it will find these test scores much less reliable than if all twelve students had taken the test at the same time, all twelve tests being administered by the same examiner.

One reason for the unreliability of these tests is probably the fact that, until this year, it has been necessary to give these students a form of the test which has been used in some previous year, and there is always the likelihood that the student, from talking with those who have had the test in the past, may receive some information about the test which would give him an undue advantage in taking the make-up examination.

Chart 6.—Relationship Between Aptitude Test Scores and Performance in Freshman Medical Classes of Students Taking Supplementary Tests



We have suspected, too, that another cause of the unreliability of the test results is the fact that in most instances the examiner has only one or two students taking the test, and consequently is not as careful as he should be to follow the standard administrative procedure. In some cases, the students probably are required to take the test in a classroom where the professor is lecturing to a class. This would handicap the student taking the test and tend to produce a grade too low to indicate his true ability. On the other hand, there are, doubtless, instances where the student is allowed to take the test in a professor's office and he is probably left alone during part of the examination period. In many instances, we have had clear indications that the time allowed for taking the test has been very poorly kept by some examiners. In a majority of these cases more time than that specified in the directions has been given, but in some cases

there is evidence that the students were not allowed the normal amount of time for taking the test. To deviate from the standard time in administering the test is about as disastrous to the test results as for a person who is giving a metabolism test to have the clock part of the metabolism machine deviate one or two minutes in an eight minute test. The accurate keeping of time becomes increasingly important when a preliminary study sheet is used.

Without doubt, such procedures will, in some cases, produce a grade entirely out of line with the student's ability and aptitude. Such irregularities are not entirely the fault of the person administering the test, for frequently he is asked to do so on short notice with little opportunity to adjust his schedule for the extra test. We could hardly hope that these supplementary tests, as administered in the past, would be given with the same regard for following a formal administrative procedure that is displayed in December for the regular test, the date for which is announced nearly two months in advance, allowing the professor to plan his schedule so as to allow the full time necessary for giving the test in a suitable room under the conditions specified by our Committee.

In investigating this second cause of discrepant cases among students taking supplementary tests, we have made a study comparing the performance in medical school of all students who have taken supplementary tests in the Committee's office under absolutely standard conditions with that of students in five medical schools who had taken supplementary tests in various premedical schools. These schools were selected for the study because each year they have requested that we arrange tests for a number of applicants. This study covers tests given during the past four years. It was found that the scores of students taking the test in our office showed a correlation with their first year medical school averages of +.65, while those given in the premedical schools gave a correlation of —.17. In the case of one of the larger medical schools which each year requests that special tests be arranged for several applicants, we found a correlation of —.01 between the scores of those students taking supplementary tests who had been admitted to the last four freshman classes (1934-1935, 1935-1936, 1936-1937, 1937-1938) and their first year medical school averages.

In another medical school which admitted ten students taking supplementary tests to their last three first year classes, we found that five of these were dropped for failures at the end of the year, one withdrew voluntarily, leaving only four students of the original ten, and only one of these had a freshman average as high as 80.

Additional data on this study are presented in charts 6 and 7.

This study would tend to show that the second factor, namely vigilance on the part of a disinterested proctor in following the directions, is of prime importance in determining the reliability of the test score.

It was hoped that with the following new method for handling supplementary tests which we inaugurated this year: (1) of giving only one supplementary test each year on a date announced well in advance, at a few designated centers, supervised by our regular representatives in the colleges who have had charge

of the December tests in their schools, and (2) of preparing an entirely new form to be used only for this one group, that the factors producing discrepancies would be eliminated and that the few extra tests which we would no doubt find it necessary to give each year would give as reliable an indication of the students' aptitude for medicine as those given at the regular date in December.

Deviations of Scores of Supplementary Medical Aptitude Tests Administered in Committee Office

Deviations of Scores of Supplementary Medical Aptitude Tests Administered in Various Premedical Colleges

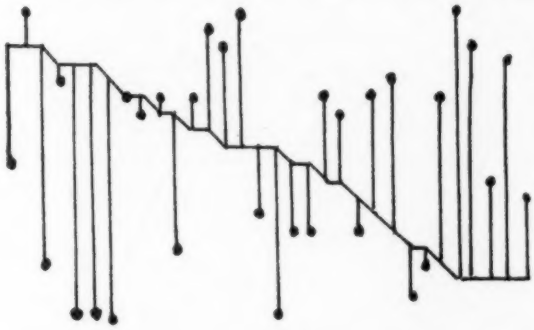


Chart 7.—Comparison of Predictive Value of Supplementary Aptitude Tests Administered in Committee Office with Those Administered in Various Premedical Colleges

IV. *Summary.*—This study throws light on several problems that have been considered by our Committee in past years. Ideally, the best results would be obtained by having the tests administered, including the December test, not in all premedical schools, but in sixty or seventy centers, and in each instance the person who gives the test should be specially trained to do so. In giving the test he would not only have students from his own school, but students from

various other schools as well. This would make the testing procedure more impersonal and eliminate the temptation to try to make his own students show up better on the test by giving them more time or other unfair advantages. It is very doubtful, however, whether at the present time the Association would approve this change, and in case it would not, we will have to continue giving the December test in the more than six hundred premedical schools.

The predictive value of the tests taken at the regular time in December is much higher than that of special tests administered at various times subsequent to December. Last year we tried to improve on the methods of administering the special tests by having them given in a few centers and we tried further to give an incentive to the students to take the test in December by charging $5 for the special test, whereas, only $1 is charged for the December test. Unfortunately, considerable protest came from some of the medical schools about this change. It is apparent, however, that very little value can be attached to the data secured by the special tests as they were administered prior to last year. From the standpoint of value of the test scores, we would probably do well either to keep the same arrangement that we put into force last year, or to give two tests a year, one in December, and one in April, charging one dollar for each of the tests. The difficulty in this latter suggestion is the fact that a large number of the students would wait for the April test, and once again we would have the situation of an examiner in a small school having to give the test twice a year to only one or two students which, as we pointed out above, is not good from the standpoint of testing efficiency.

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Accreditation of Educational Institutions

The Association of Land Grant Colleges and Universities and the National Association of State Universities last November (1938) appointed a joint committee on accrediting with instructions "to prepare for members of this Association a list of the approved agencies with which the members are encouraged to cooperate. It is understood that the agencies seeking to institute accrediting procedures must first secure the approval of this standing committee."

This committee met in Washington in February and gave long consideration to this problem. As a first step in classifying desirable accrediting agencies, the chairman of the committee, Dr. John J. Tigert, president, University of Florida, was instructed to gather additional information from the various institutions concerned. The Committee has sent out two lists to each college or university: (1) Specific criticisms or objections which the committee feels now exist with reference to accrediting agencies, and (2) a list of accrediting agencies. Recipients of these lists are asked to supplement both lists.

General Criticisms or Objections Which the Joint Committee Offers Concerning Accrediting Agencies.—

1. There are too many accrediting agencies. Furthermore, accrediting began largely on an institutional basis, was extended to colleges or schools within an institution, and now is getting on a departmental or single curriculum basis.

2. The accrediting agencies are invading the rights of the institutions and destroying institutional freedom. This, in some instances, is a violation of law and a usurpation of the powers vested in boards of control. This applies not only to finances, but also to educational programs.

3. Accrediting agencies tend to put institutions in a straight-jacket. Uniformity in American colleges has undesirable aspects.

4. The costs of accrediting are becoming excessive. These involve not only amounts in money that are levied upon the institutions for the purpose of paying for visits and studies, but also time spent in travel and other burdens placed upon the staffs of the institutions who participate in the accrediting, making and filling out questionnaire, etc.

5. There is too much duplication. Examples are found in regional, national and departmental conflicts.

6. In some institutions accrediting agencies do not confine themselves to a study of the particular field in which they are engaged. There is a disposition to investigate other departments of the institution and make recommendations concerning them.

7. The recommendations and requirements of accrediting agencies frequently result in throwing the budget and the educational program of the institution out of balance by requiring disproportionate expenditures and laying undue emphasis on colleges, departments or curricula in which particular groups are interested.

8. The standards of accrediting agencies are now largely outmoded. For example, they tend to be quantitative rather than qualitative, i.e., they set up external, mechanical items that are measurable (number of faculty, size of library, floor space, amounts of money

expended) rather than an actual evaluation of the kind of work that is done.

9. Something of the guild system or trade unionism seems to be invading the movement. Practitioners, professional and vocational groups who are already engaged in practice or the professions are attempting to dominate those who are responsible for education; for example, doctors, chemical engineers, lawyers, etc.

Accrediting Agencies. — Thirty-four accrediting agencies are listed. The Committee requests information as to objectionable practices which colleges have incurred in their relations with any of the accrediting agencies. This, it is said, would be of great value to the Committee in attempting to discover the agencies with which colleges should not continue to cooperate.

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Licensure Statistics for 1938

The annual report made by the Council on Medical Education and Hospitals on licensure is published in the *Journal of the American Medical Association,* April 29, 1939.

This report always elicits much interest, especially of the medical colleges which have prepared students for this eventuality. A number of points are not brought out by these statistics. First, it is a report on examinations. One applicant may have taken more than one examination in one or more states. Second, the examinees do not represent the graduates of any one year. Third, not all graduates of 1938 are represented by the data given. Therefore, the report merely shows what happened in the field of licensure during the year 1938. But despite these items, the report has great value as a check-up. If a college which is shown to have had failures in licensure examinations will check on them, it may find that one examinee is responsible for all the reported failures. That being the case, the percentage of failures would be considerably smaller than reported. For example, four examinees, three fail, 75 per cent failures. On inquiry, it may be learned that one man made the three failures which would reduce the percentage for the school to 50.0, only two men having been examined.

An analysis of the data given shows that the percentage of failures for all approved schools in 1938 was 2.9 as against 3.68 for 1937. In 1938, 19 schools did not have any failures among 1,146 examinees, about 20 per cent of all examinees. In 1937, 16 schools did not have any failures among 1,111 examinees. In 1938, the highest percentage of failures for any one college was 11.5 as against 18.2 in 1937 and 28.0 in 1936. In 1938, only three schools had more than 10 per cent of failures. In 1938, 47 schools had 153 failed examinees; in 1937, 51 schools had 120 failed examinees. Of the 47 schools reported as having had failures, 32 had less than 5 per cent, represented by 69 examinees; 15 schools had from 5 to 11.5 per cent, represented by 84 examinees.

All these detracting figures are less alarming than they were in 1937 or in preceding years. There is, then, considerable improvement in selection of students, instruction and licensing examinations. Which of these three items carries most weight is a moot question, one which can be answered in many ways. One guess is as good as another.

For Canada, data on eight schools are available. Three of these, represented by 30 students, did not have any failures. The remaining five schools were represented by 133 examinees, 15 of whom failed, giving a percentage for all failed Canadian graduates of 11.3 per cent. The highest percent of failures for any one school was 27.3 (3 examinees); the lowest, 4.5 (3 examinees). Perhaps, these failures should be charged to "returning" Americans, some of whom may have failed in being accepted by any of our own schools—a condition which the Canadian schools have remedied in recent years. In the absence of confirmative data, a direct statement cannot be made. Of the 163 examinees representing Canadian medi-

cal schools, 9.2 per cent failed as against 2.9 per cent of our own schools. On the basis of schools not having any failures, the Canadians have a representation of 37.5 as against 25.7 for us. In other words, they have the best of us on that score.

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St. John's College
Program

Two years ago, St. John's College, Annapolis, Maryland, announced that it had abolished the elective system in favor of a four year all-required curriculum; its basic requirement would be the reading, and discussing in seminar, of one hundred great books, the classics of our civilization, from the Greeks to the present. Some of the books selected deal directly with the liberal arts themselves — with mathematics, natural science, history and social science, philosophy, literature — the arts of thinking, of reading, of writing, of reckoning. Others are examples of the practice of those arts. An understanding of these books is the prime goal of the student during his four years training. Once or twice a week, he hears a formal expository lecture, a lecture in which the speaker makes no effort to talk down and in which the student's obligation is not to take notes but to understand. Five times a week, in small classes or "tutorials," he studies language, although the language he studies varies each year—Greek, Latin, English.

Five times a week he studies mathematics in the same way, beginning with Euclid's *Elements of Geometry*. Once a week, for three hours, in each of the four years he works in a scientific laboratory. This laboratory is mathematical and mechanical the first year; physical, the second; it is a laboratory of physical chemistry, the third; of biochemistry, the fourth. It is closely correlated with the scientific works in the list of great books.

Dr. Stringfellow Barr, president of St. John's, in his president's report to the Board of Governors of the College says:

"Unlike the elective system, it does not permit the student to ignore subject-matters he finds difficult: it challenges him to find out, under competent guidance, why subjects he thought "uninteresting" are actually nothing of the sort. He is not allowed to exploit his eccentricities and peculiarities, or his "personality" as it is now frequently called, by cherishing his lamenesses and blindnesses and intellectual deformities. He is encouraged to think of his weaknesses as weaknesses and to set about correcting them as speedily as possible. He is encouraged to think of freedom, not as freedom to be ignorant, but as the trained capacities of his mind that will free it for any task."

As for the teachers, Dr. Barr says:

"Except for a few elderly men, there are no longer teachers in America who themselves possess a basic, general education . . . For our faculties are composed of men who are themselves the maimed products of a too early specialization and therefore victims of the higher illiteracy. Where, then, get teachers capable of guiding students to these buried treasures? . . . St. John's has today the strongest faculty in America. Every American college or university faculty may be divided into those who wrote the books which the student is required to read and those who teach orally; into those whom we may call the authors and those whom we may call, not invidiously, the talkers. In other colleges the talkers do the teaching, and an increasing proportion of the authors are other talkers, talking members of neighboring college faculties. Both faculty groups are roughly of the same calibre, those who wrote the textbooks and those who give the lectures. At St. John's this is not true. The authors have been carefully selected from the writings of twenty-five centuries, selected for their clarity, their profundity, and their teaching capacity. This year's freshmen have been taught by such well known men as Plato, Thucydides, Aristotle, Aeschylus, and

Euclid. The sophomores, who had already been taught by these men last year, have been listening to Tacitus, Plotinus, Dante, St. Thomas Aquinas, Ptolemy, Leonardo, and Copernicus. Next year they will "study under" Shakespeare, Cervantes, Moliere; Calvin, Francis Bacon, and Locke; Kepler, Harvey, and Newton. In their senior year and for their benefit Gibbon, Adam Smith, Marx, Bentham, James, Freud, Lavoisier, Darwin, Mendel, and other moderns will join our faculty. To aid them in understanding these great teachers, we have a "talking" faculty of teachers who do not pretend to be as good as, or better than, the authors they assign their students to read—a frequent and justifiable pretension in most colleges today—but who conduct seminar discussions, tutor in language and mathematics, lecture rarely, supervise laboratory work, and, like the students, learn from the "authors" whom the whole college studies. As in other colleges, the talking faculty is on our pay-roll; the authors are not."

The first class to graduate after four years of exposure to this plan will be the class of 1941. What sort of man will one or any of these graduates be like? Dr. Barr has an answer for that question. He predicts that the graduate will be able to think clearly and imaginatively, to read even difficult material with understanding and delight, to write well and to the purpose. He will be able to distinguish sharply between what he knows and what is merely his opinion. He will have acquired a distaste for the second-rate, the intellectually cheap and tawdry; but he will have learned to discover meaning in things that most people write off as vulgar. He will get genuine pleasure from using his mind on difficult problems. He is likely to be humorous: he will certainly not be literal-minded.

He will not be a trained specialist in anything; but he will be in a better position to acquire such specialized training, whether in law, medicine, engineering, business or elsewhere, more quickly than it can be acquired by even the best American college graduates today. For he will know how to apply his mind to whatever he wishes to master.

His appetites and his emotions will be under his control, not because he has had "character training" but because he knows the reasons for self-control and has deliberately acquired the powers of self-mastery.

Will he be a "success"? Well, he will on the whole be unlikely to make his million because a million is not readily made except by those who sacrifice to its making the very things this future graduate of St. John's will have learned to value more than wealth. On the other hand he will be likely to earn a good livelihood, if only because he knows how to use his head and has learned how to work during the very years which most college boys spent learning to loaf and dodge. When he is not working, he will be able to distinguish between leisure and idleness.

He will be eminently practical, not because he "took" practical courses in college, but because he will have acquired the rare intellectual capacity to distinguish means from end. He will have learned to locate the problem, resolve it into its parts, and find a relevant solution. He will, in short, be resourceful.

He will be concerned to exercise a responsible citizenship and he will be as much concerned with his political duties as with his political rights. He will cherish freedom, for himself and others, but it will be not merely freedom from concentration camps; it will be freedom from ignorance and passion and prejudice as well. For, in a quite genuine sense, he will himself be a free man.

He will know something of the world he graduates into, not in the sense merely of a current events contest; but because he will know the background and development of the political institutions and economic practices he confronts. He will even have means of understanding the movements in contemporary thought. And

he will be familiar with the basic scientific concepts that underlie modern technology.

Not only will he be better prepared than his contemporaries to enter business or a professional school. Not only will he be better prepared to fulfill his obligations as a citizen. He should make a better friend, a better husband, a better father: free men do. He will in short be better prepared to live; and, when his hour comes, whether through illness or civil disaster or in an army trench, he will know better how to die: free men do.

This program promises to do away with "premedical" education and substitute therefor what medical colleges desire, a sound basic education in culture, in the classics which will give them students who know how to think, to reason, to learn—not memorize. It will stop the race for "credits" and substitute a desire to "know." These students will understand. They will undergo an intellectual awakening. Utopian? Not at all. Ideal? Yes. The plan has been in operation for nearly two years and has proved its worth. It merits support by every arts college. St. John's is to be congratulated on having the courage to "return" to first principles in education.

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Announcement of Intern Appointment

As announced in a preceding issue of *The Journal* (May, p. 191), the committee appointed by the Executive Council of the Association of American Medical Colleges and charged with the responsibility of making a careful and thorough study of the internship problem, began its work by attempting to ascertain what the reaction would be of hospitals to the suggestion that intern appointments be announced simultaneously the country over on a certain date.

The committee concluded that it is important to contact, first, the larger hospitals, the ones which annually appoint many interns. Acting on that basis, a list of 363 hospitals was made up. A letter was sent to these hospitals setting forth the problem with which the committee is concerned and suggesting for consideration November 15th as the date on which intern appointments will be announced.

At the moment, nearly 75 per cent of these hospitals have replied; nearly 95 per cent have agreed to announce appointments on November 15th. The remaining 5 per cent did not concur for various reasons. All hospitals agree that something should be done to clarify the intern problem and will join the committee in bringing its efforts to fruition. On the whole, then, the results achieved thus far are very gratifying and encouraging. This is the first real effort made by any group or organization to bring order out of chaos in the best interests of all concerned, the hospital, the student and the medical school.

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Anesthesia Course

There is an excellent opportunity open for graduate work in the field of anesthesia as preparation for the examination of the specialty board. Apply to Association headquarters for details.

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Teacher Placement Bureau

WANTED: Associate professor of obstetrics, $4,500; assistant professor of pediatrics, $3,000; instructor in medicine, $2,500.

A pediatrician who will do research on nutrition in children and teach.

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The Advisory Council on Medical Education was created June 24 at a meeting in Chicago by eleven national organizations concerned with the training of physicians to meet the present day needs of medical care for the country. The need for some central representative agency has long been recognized as necessary to make medical training

more effective than it has been in its service to the public.

Dr. Willard C. Rappleye, Dean of the Faculty of Medicine of Columbia University, who was elected president, stated that the purpose of the Advisory Council is to correlate the efforts of the universities, medical schools, hospitals, licensing bodies, public health associations and boards of specialists.

"This organization brings together for the first time the various national bodies dealing with all phases of the training and licensing of physicians beginning with his preparatory college work and including medical education, hospital internship, residency, licensure and graduate training for specialization. Cooperation and coordination are to be substituted for present overlapping and competing functions of existing agencies."

OFFICERS:

Dr. Willard C. Rappleye, Dean of the Faculty of Medicine of Columbia University .....President

Dr. Maurice H. Rees, Dean of the School of Medicine of the University of Colorado .....Vice President

Dr. Robin C. Buerki, Director of Study of the Commission on Graduate Medical Education .....Secretary-Treasurer

The Executive Committee consists of the officers and the following:

Dr. Anton J. Carlson, Professor of Physiology of the University of Chicago

Dr. Harold Rypins, Secretary of the New York State Board of Medical Examiners

Dr. Hugh J. Morgan, Professor of Medicine of Vanderbilt University

Dr. Arthur W. Allen, Surgeon, Boston

The organizations represented on the Advisory Council are:

	Number of Representatives
Association of American Medical Colleges,	3
American Hospital Association	3
Catholic Hospital Association	1
Federation of State Medical Boards of the United States of America	3
Advisory Board for Medical Specialties	3
National Board of Medical Examiners	1
American College of Surgeons	2
American College of Physicians	2
Association of American Universities	2
American Public Health Association	1
American Association for the Advancement of Science, Division of Medical Sciences	1

The new members will have the following membership:

American Protestant Hospital Association,	1
Association of American Colleges	2

Among the important problems considered by the Advisory Council at its meeting were those of proper educational standards of the hospital internship, adequate training for the specialist, sound programs for the continued education of physicians in practice, modifications in college preparation for medical studies, the simplification of the procedure for licensure in the 48 separate states, and the status of training of graduates of foreign medical schools. Special committees of the Council were appointed to study these various questions.

College News

Wayne University
College of Medicine

A grant of $2,000 from Parke Davis & Co. will provide for a year's research into the cause and treatment of peptic ulcer. Dr. David Sandweiss, instructor in clinical medicine, and M. H. F. Friedman, Ph.D., research associate in physiology, with rank of instructor, will be in direct charge of the work, while Thomas L. Patterson, Ph.D., will supervise the research.

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Washington University
School of Medicine

The first Robert J. Terry Lecture under the Foundation established by the Washington University Medical Alumni Association was delivered by Dr. Lewis Hill Weed, Director of the Johns Hopkins University Medical School, on Wednesday, May 17th. The subject of Dr. Weed's address was "The Anatomist in Medical Education."

Dr. Robert A. Moore has been appointed Edward Mallinckrodt Professor of Pathology and head of the department.

Dr. E. V. Cowdry, professor of cytology, delivered the Woodward lecture at Yale Medical School. His subject was: "Problems of Ageing."

Carlyle F. Jacobsen, Ph.D., professor of medical psychology was presented with the Howard Crosby Warren Medal by the Society of Experimental Psychologists for his studies on the functions of the frontal lobes of the brain.

The fourth Leo Loeb Lecture under the annual lectureship established by the Mu Chapter of the Phi Beta Pi Medical Fraternity was delivered by Dr. Soma Weiss, associate professor of medicine at Harvard University Medical School, April 20, 1939. The subject of Dr. Weiss' address was "Vasomotor Reactions and Circulatory Collapse."

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Western Reserve University
School of Medicine

The American Association of Clinical Pathologists, meeting in St. Louis, last night conferred its Burdick Award, a gold medal given annually for outstanding contribution to medical science, upon Dr. Harry Goldblatt, professor of experimental pathology and associate director of the Institute of Pathology of Western Reserve University, Cleveland, together with citation of Dr. Goldblatt's researches in hypertension and his discoveries of relationships between high blood pressure and diseases of the kidneys.

The John and Mary R. Markle Foundation of New York has made a grant of $4,100 to this school to be expended by Dr. Carl J. Wiggers, professor of physiology, for the study of the ultimate nature of ventricular fibrillation and means of sensitizing and desensitizing the heart.

The Commonwealth Fund has awarded a traveling fellowship to Dr. Harold D. Green, assistant professor of physiology, for advanced study in physics in the Division of Biological Engineering, Department of Biology and Public Health, Massachusetts Institute of Technology, where he has been appointed visiting professor for the next academic year.

Dr. Normand L. Hoerr has been appointed Henry Wilson Payne Professor of Anatomy and head of the department, to fill the vacancy left by the death of the late Dr. T. Wingate Todd. He has been a member of the department of anatomy at Chicago University since 1926.

The senior prize in surgery, the gift of Dr. Elliott C. Cutler, and the senior prize in obstetrics, the gift of Dr.

Edwin C. Garvin, were awarded to Jacob B. Tuckerman (M.D., June, 1939). The Dr. Herbert S. Steuer Memorial Prize for special work in anatomy was awarded to R. Wenner Wachamer, a member of the freshman class.

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Northwestern University
Medical School

An annual prize of $100 has been established by the Zeta chapter of Nu Sigma Nu at the Northwestern University School of Medicine, to be awarded each year on the basis of scholarship, personality and general qualifications for the making of a successful physician. The Committee of Award is composed of Dean Irving S. Cutter; Loyal Davis, professor of surgery; Andrew C. Ivy, professor of physiology; and the active president of Zeta chapter of Nu Sigma Nu. In addition to the money prize the fraternity will place a bronze tablet in the Medical School Library on which the names of the winners will be inscribed in chronological order. The first award will be made to a Senior of the 1939 graduating class.

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University of Toronto
Faculty of Medicine

Dr. William Belfry Hendry, professor emeritus of obstetrics and gynaecology died March 24th. He graduated in arts from the University of Toronto in 1895 and in medicine in 1904. He joined the staff of the University in 1906 as assistant demonstrator of anatomy; the following year he was appointed demonstrator in gynaecology; in 1912 he became associate professor of that department and in 1922, full professor. Dr. Hendry was the recipient of many honors from scientific and educational organizations.

Award of medals, prizes, fellowships, scholarships and bursaries: *Sixth Year*: Faculty Gold Medal, D. H. Copp; Faculty Silver Medal, J. C. McCulloch, R. F. Gerred; Ellen Mickle Fellowship, D. H. Copp; Chappell Prize in Clinical Surgery, C. C. Gray; William John Hendry Memorial Scholarship in Obstetrics and Gynaecology, D. H. Copp; Ontario Medical Association Prize in Preventive Medicine, D. H. Copp; David Dunlap Memorial Scholarship, W. R. Read.

Undergraduate: David Dunlap Memorial Scholarships, 3rd year, H. H. Fireman, 5th year, T. A. Fraser; Ronald S. Saddington Medal in Pathology, E. Lampert; John Copp Bursary, C. A. Stephens; B'Nai Brith Scholarship, B. Winter; Toronto Women's League of the United Synagogue, H. H. Fireman; Baptie Scholarship, Miss W. G. Allison.

Graduate: Reeve Prize, D. P. Lloyd; Starr Gold Medal, R. E. Haist; Alexander McPhedran Research Fellowship in Clinical Medicine, J. L. A. Fowler; Faulkner Medal in Psychiatry, T. A. Sweet; J. J. Mackenzie Fellowship in Pathology and Bacteriology, J. D. Duffin.

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Columbia University
College of Physicians and Surgeons

Dr. Tracy J. Putnam, professor of neurology in Harvard Medical School, has been appointed professor of neurology and neurosurgery at Columbia. He will also serve as director of these services at the Neurological Institute.

Dr. Vernon W. Lippard, director of the Commission for Study of Crippled Children of the City of New York, has been appointed assistant dean, succeeding Dr. Chas. A. Flood who resigned to enter private practice. Dr. Laurence W. Sloan, assistant director of New York Post Graduate Hospital and Medical School also resigned to enter private practice.

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University of Virginia
Department of Medicine

The American Philosophical Society has awarded a grant of $400 to Dr. C. C. Speidel in aid of his cinephotomicrographic studies of living tissues.

The Twenty-Third Post-Graduate Clinic under the direction of the Uni-

versity of Virginia Extension Division was held at the Medical School on May 5th. The program consisted of a symposium on Vitamins as follows: A General Review of the Vitamins by Dr. H. B. Mulholland; Clinical Tests of Vitamin Deficiencies by Dr. H. D. Kruse of New York City; Vitamin K in Newly Borns by Dr. W. W. Waddell; Vitamin D by Dr. L. T. Royster; Human Vitamin Requirements and Therapeutic Dosages by Dr. W. H. Sebrell of the U. S. Public Health Service; and Pellagra by Dr. J. M. Ruffin of Duke University. Seventy-two physicians attended the Clinic.

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Medical College of Virginia

Commencement Exercises closing the one hundred first session of the Medical College of Virginia, Richmond, Virginia, were held June 6. Dr. Otis W. Caldwell, General Secretary of the American Association for the Advancement of Science, gave the Commencement address.

The John and Mary R. Markle Foundation of New York recently made a grant of $3,000 for studies in liver poisoning in the department of biochemistry. This project will be under the direction of Dr. J. C. Forbes, associate professor of biochemistry, who has done extended work in this field. The Dazian Foundation for Medical Research has also made a grant to the college of $700 for research in preventive medicine.

The college has received in gifts, grants, and bequests during the current fiscal year $2,023,204.

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Louisiana State University
School of Medicine

Dr. A. G. Eaton, assistant professor of physiology, has received a grant of $300 from the Committee on Scientific Research of the American Medical Association to continue his work on the absorption of amino acids.

The Department of Pathology and Bacteriology has been invited to participate in a study of certain phases of the cancer problem now being investigated by the United States Public Health Service. The special phase of the investigation to be participated in by the Department of Pathology and Bacteriology will cover a period of years. Dr. Kenneth L. Burdon, Assistant Professor of Immunology and Bacteriology, has been appointed consultant in charge from the Louisiana State University School of Medicine.

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University of California
Medical School

Dean Langley Porter has arranged a series of evenings of fine music at the Medical School from the Holbrook Memorial Phonograph Collection of the University of California. The concert in March included the works of Strauss, Mozart, Verdi, Puccini, von Weber and Wagner. The April concert was devoted to the works of Chopin, and the May to an "All Tschaikowsky" program. Members of the faculty and students have enjoyed the concerts.

Allan Palmer, formerly a member of the staff of the Medical School and, this year, the holder of a Rockefeller Fellowship, is working in the Department of Anatomy at Oxford under Dr. S. Zuckerman.

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Boston University
School of Medicine

Boston University School of Medicine has embarked on a campaign to raise $1,000,000 for a new building and an increase in endowment. The new structure will be located on the school's present site, 80 East Concord Street, immediately adjoining the Massachusetts Memorial Hospitals and across the street from the Boston City Hospital. Half of the money to be raised will be used for the building itself and half for endowment. Actively participating in the campaign is the entire Boston University organization, including not only medical alumni and faculty, but also alumni of every school and college within the University as well as trustees and a strong women's committee.

Yale University
School of Medicine

The General Education Board of the Rockefeller Foundation has made a grant-in-aid of $85,000 to be distributed over a period of five years, and the Carnegie Corporation has appropriated the amount of $10,000 a year for three years in support of the clinic of child development. Under the direction of Dr. Arnold L. Gesell the clinic is continuing its systematic studies of the behavior of infants.

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Johns Hopkins University
School of Medicine

Dr. Dean Lewis, professor of surgery since 1925, has resigned on account of ill health. He will become professor emeritus.

Dr. Lewis H. Weed, professor of anatomy, delivered the first Robert J. Terry lecture at Washington University School of Medicine, May 17th. The subject of his lecture was "Anatomy in the Medical Curriculum."

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University of Pennsylvania
School of Medicine

Friends of Dr. John C. Gittings, professor of pediatrics gave a dinner in his honor on his sixty-fifth birthday. His portrait was presented to the University by Dr. Graeme Mitchell, professor of pediatrics in the University of Cincinnati College of Medicine.

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University of Wisconsin
Medical School

An Institute for the Consideration of the Blood and Blood-Forming Organs, will be conducted September 4-6, 1939. The program is to include papers and round table discussions by European and American workers in the field of hematology. In addition to the discussions, the following formal papers are to be presented: Dr. L. J. Witts, Oxford, England, "Anemias due to Iron Deficiency;" Dr. Cecil J. Watson, Minneapolis, "The Porphyrins and Diseases of the Blood;" Dr. Cornelius P. Rhoads, New York, "Aplastic Anemia;" Dr. E. Meulengracht, Copenhagen, Denmark, "Some Etiological Factors in Pernicious Anemia and Related Macrocytic Anemias;" Dr. Harry Eagle, Baltimore, "The Coagulation of Blood;" Dr. George R. Minot, Boston, "Anemias of Nutritional Deficiency;" Dr. Russell L. Haden, Cleveland, "The Nature of the Hemolytic Anemias;" Dr. Jacob Furth, New York, "Experimental Leukemia;" Dr. Claude E. Forkner, New York, "Monocytic Leukemia and Aleukocythemic Leukemia;" Dr. Edward B. Krumbhaar, Philadelphia, "Hodgkin's Disease;" Dr. Louis K. Diamond, Boston, "The Erythroblastic Anemias;" Dr. Edwin E. Osgood, Portland, "Marrow Cultures;" Dr. Charles A. Doan, Columbus, "The Reticulo-Endothelial System;" Prof. Hal Downey, Minneapolis, "Infectious Mononucleosis;" Dr. Paul Reznikoff, New York, "Polycythemia."

Physicians and others who are interested are cordially invited. A detailed program may be obtained by addressing Dr. Ovid O. Meyer, Chairman of Program Committee, University of Wisconsin Medical School, Madison, Wisconsin.

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University of Cincinnati
College of Medicine

Dr. Alfred Friedlander, dean, died May 28th. He had been a member of the faculty for many years as professor of medicine, and succeeded to the deanship in 1935 when Dr. A. C. Bachmeyer came to the University of Chicago.

Dr. Tom D. Spies, associate professor of medicine, was awarded the John Phillips Memorial Medal by the American College of Physicians for "outstanding contributions to the science of nutrition and particularly for his studies on the nature and character of pellagra."

University of Chicago
Medical Schools

William H. Taliaferro, Ph.D., dean of the division of biological sciences and professor of parasitology, was awarded the Eliakim H. Moore Distinguished Service Professorship in recognition for his work in tropical diseases.

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Stanford University
School of Medicine

The twenty-seventh course of Lane Lectures was given by Dr. Thomas M. Rivers on May 22, 23, 24, 25, and 26, 1939. The general title for the series of lectures was "Viruses and Virus Diseases". Dr. Rivers is the Director of the Hospital of the Rockefeller Institute for Medical Research and is an international authority on virus diseases.

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Jefferson Medical College

The 114th Commencement was held June 2nd. The graduating class numbered 122 bringing the total number of graduates to 16,569.

The valedictory address was delivered by the Honorable Arthur H. James, governor of Pennsylvania, who also was awarded the honorary degree of Doctor of Laws.

The annual William Potter Memorial Lecture was delivered by Major General (retired) Merritte W. Ireland, former Surgeon General of the U. S. Army, a member of the Class of 1891.

Promotions and Appointments: Dr. Bernard J. Alpers, Professor of Neurology; Dr. Lewis C. Scheffey, Clinical Professor of Gynecology; Dr. Arthur J. Davidson, Clinical Professor of Orthopedic Surgery; Dr. Edward F. Corson, Clinical Professor of Dermatology, Dr. Creighton H. Turner, Associate Professor of Medicine; Dr. Garfield G. Duncan, Associate Professor of Medicine, Dr. A. Cantarow, Associate Professor of Medicine, Dr. Robert A. Matthews, Assistant Professor of Psychiatry, Dr. Leandro M. Tocantino, Assistant Professor of Medicine.

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George Washington University
School of Medicine

Dr. Walter A. Bloedorn, professor of medicine, has been appointed dean. The appointment fills the vacancy that occurred when Dr. Earl B. McKinley was lost on the Hawaii Clipper in July 1938.

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Marquette University
School of Medicine

Irvin Abell, a graduate of St. Mary's College, a Doctor of Medicine of Louisville Medical College, a postgraduate student in the University of Berlin, recipient of the Lactare Medal in 1938, professor of surgery at Louisville University since 1904, fellow of the American College of Surgeons and the American Surgical Association, who, by his long and distinguished service to the field of Medicine and particularly by the capable and efficient administration of his office as president of the American Medical Association in 1938-1939, when that organization was confronted with most difficult problems concerned with basic social principles of the practice of medicine, is entitled to the Degree of Doctor of Laws, honoris causa.

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State University of Iowa
College of Medicine

May 11th, Dr. H. O. Haterius, of the department of physiology, Wayne University College of Medicine, Detroit, gave a lecture on "Hormones of the Pituitary Gland" at the State University of Iowa College of Medicine. This lecture was sponsored jointly by the University Graduate College and the Iowa chapter of the Society for Experimental Biology and Medicine.

Dr. H. P. Smith, professor of pathology, has received a grant of $1,500

from the John and Mary R. Markle Foundation for further studies in blood coagulation and hemorrhagic diseases. This grant is in addition to one of $10,000 previously awarded for studies in this field.

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University of Alberta
Faculty of Medicine

Beginning with the session 1940-1941, the admission requirements will be increased to three years of college work and five years of medicine, a total of eight years before the M.D. degree will be conferred. Clinical teaching facilities in the Royal Alexandra Hospital have been enlarged to a considerable degree. Larger quarters are being provided for the outpatient department in a self contained building not far from the present building which will provide better physical facilities both for teaching and care of patients.

Dr. D. G. Revell has been nominated professor emeritus of anatomy on his retirement. He will be succeeded as head of the department by Dr. R. F. Shaner. Dr. W. F. Gillespie has succeeded Dr. Alexander Munro as professor and head of the department of surgery. Other faculty changes are: Dr. Irving R. Bell, from Associate Professor to Professor of Therapeutics; Dr. Angus C. McGugan, from demonstrator to lecturer in hygiene; Dr. H. E. Rawlinson, associate professor of anatomy; Dr. Floyd S. B. Rodman, assistant professor of physiology and pharmacology; Dr. H. H. Hepburn, from associate professor of surgery and clinical professor of neurology to associate professor of surgery and professor of neurological surgery; Dr. Morton E. Hull, assistant professor of pathology; Dr. Gordon N. Ellis, clinical professor of urology; Dr. J. Ross Vant, assistant professor of obstetrics and gynecology.

General News

REBUTTAL

The following letter is published in the *Journal of the Association of Medical Students,* April, 1939:

Our Scottish Colleagues

We have just received official information that the New York State Education Department has decided to stop issuing qualifying certificates to students intending to study medicine in the extramural schools of Great Britain. The reason for this action is entirely unknown both to us and to the Scottish Medical authorities.

The excellent standard of Scottish medical training enjoys a world wide reputation. This ruling of the Department constitutes an unwarranted insult to this tradition. The results of the State Board examinations as reported in the New York *Times* of January 28, show that *Scottish trained students made higher ratings than those from schools in all states other than New York.*

99% of the American medical students in Scotland are Jewish. Is this new ruling to be construed as a further effort in the programme of religious discrimination?

The information concerning the Scottish medical schools that has been published in many American journals is both misleading and erroneous. The course of study has recently been increased from 5 to 6 years, as contrasted with the 4 year course in the United States. Can we doubt the integrity, sincerity, and merit of the students who undertake so lengthy and vigorous a training?

The action of the Department in this case is a flagrant violation of the honorable tradition of medicine and can serve in no way to further the aims and principles of the profession. In view of the resolution adopted at the Philadelphia Convention decrying discrimination on religious grounds, we, as affiliates of the A.M.S., urge an immediate investigation of the problem to determine whether the ruling violates this basic principle of American democracy as enunciated in the A.M.S. resolution.

American Medical Club of Glasgow
American Club of Edinburgh

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The New Medical Curriculum in Germany

The curtailment effected by the new legislation will amount to two years; it is accomplished as follows: 1. The regular curriculum is reduced from the present eleven to ten semesters (four preclinical and six clinical). 2. The year of internship, which at present must be served immediately after the student has completed his courses and passed the state examination, is incorporated within the undergraduate schedule. At specified times the medical student will serve under a staff physician as a "famulus" in a clinic or hospital. This arrangement has existed for decades on a voluntary basis. Hospitals must now adjust their routines to this new compulsory arrangement, which at the same time deprives them of the services of the graduate interns. For many institutions this loss of the "praktikanten" will be a severe blow since these men receive no remuneration and often perform valuable service. 3. Another half year will be saved by drastic abbreviation of the time required for taking the state examinations.

Despite these curtailments, several new compulsory lecture courses have been introduced into the curriculum at the instance of the national führer of physicians and the national führer of university instructors. According to official explanation of the innovation, "it must no longer be optional with the student whether or not he commits himself with regard to questions of vital importance to national life. The phy-

sician of the future must have an authoritative, fundamental knowledge of all these problems. In future less stress will be placed on the theoretical training rather than on the principle that theoretical knowledge and practical performance may be correlated in such a way that the present lack of practical ability will be a thing of the past."

The new curriculum represents a type of medical education the introduction of which has constantly been opposed by all intelligent medical groups. It cannot be denied that the reform legislation contains good points. Hereafter the courses in zoology, botany, chemistry and physics designed for medical students will be freed of a vast amount of detail which, while valuable to the student of natural science, is of no particular importance to the medical student. In the anatomy courses, too, the student will be spared the learning by heart of the nomenclature of the most minute vessels. Conversely, *topographic anatomy will be given greater consideration.*

The following items have been introduced into the preclinical curriculum: lectures on the history and nature of the art of healing, lecture courses in ethnology and policies regarding population (scheduled for the first semester, before the student can have formed any independent opinion with regard to these things), field trips in search of medicinal herbs, supplementary to the course in botany, six weeks of practice nursing (a real advance), a lecture course on the physiology of occupation, sports and aviation, and practical experience as a worker in a factory or on a farm. The excursions in search of medicinal herbs will, of course, further the new movements for natural therapeutics. The nursing service is to be performed between the second and third semesters; it is to show whether the student is psychically equal to contacts with the sick and whether or not he should continue in medicine. Factory service or farm service, lasting four weeks, will be interposed between the third and fourth semester. This means actual work as a farm or a factory hand; the requirement was initiated by public health headquarters of the Nazi party and is designed to aid the future practitioner to a better understanding of popular needs.

To the clinical part of the curriculum have been added courses in radiology, natural therapeutics, occupational diseases, treatment of traumatic injuries, child welfare, eugenics, dental diseases, genetics, forensic medicine and deontology. Several shorter lecture courses have been added and finally two three month terms as a famulus (between the sixth and seventh and the eighth and ninth semesters).

In professional quarters fears have been entertained that training under the new curriculum will be less complete than under the present curriculum. On the other hand, it is expected that the new plan will be "much more in accord with practical needs" and "more realistic." Henceforward the German medical student must work extra hard to assimilate his courses within a brief period. Vacations and leisure periods are to be taken from him. Now he will be turned into a learning robot, hurried from one task to another. *J.A.M.A.*: Berlin Letters. April 8, 1939.

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Dazian Foundation Invites Applications for Grants

The Dazian Foundation for Medical Research, recently established in accordance with the will of the late Henry Dazian, New York, is prepared to award fellowships to graduates in medicine for graduate study and research and grants to laboratories, hospitals, and similar institutions for research in medicine. Applications and inquiries should be addressed to the secretary, 180 East Sixty-fourth Street, New York. The board of directors of the foundation is as follows: Drs. Emanuel Libman, New York, president; Israel Strauss, New York, vice-president; Philip Finkle, New York, secretary; Harrison S. Martland,

Newark, N. J.; Mr. Emil Friedlander, assistant secretary and treasurer; Mr. William W. Cohen, treasurer; Mr. Alfred L. Rose and Mr. Harold Williams.

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Students in Extramural Schools Not Admissible to the National Board's Examinations

At the annual meeting of the National Board of Medical Examiners, April 23, it was decided that students matriculating after July 1, 1939, in the extramural schools of Scotland and Ireland would not be admitted to the Board's examinations. The schools involved are as follows: St. Mungo's College and Anderson College, Glasgow; School of Medicine of the Royal Colleges, Edinburgh; and the Royal College of Surgeons, Dublin.

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Biological Photographic Association

The ninth annual Convention of this association will be held September 14-16th, at the Mellon Institute for Industrial Research, Pittsburgh, Pa. The program will be of interest to scientific photographers, scientists who use photography as an aid in their work, teachers in the biological fields, technical experts and serious amateurs. It will include discussions of motion picture and still photography, photomicrography, color and monochrome films, processing, etc., all in the field of scientific illustrating. Up-to-date equipment will be shown in the technical exhibit; and the Print Salon will display the work of many of the leading biological photographers here and abroad.

Further information about the Association and the Convention may be obtained by writing the Secretary of the Biological Photographic Association, University Office, Magee Hospital, Pittsburgh, Pennsylvania.

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The Ophthalmoscope

The American Optical Company, Southbridge, Massachusetts, publishes a brochure entitled "The Ophthalmoscope and Studies of the Fundus Oculi in Important Pathological Conditions," in which the construction and use of this instrument are described and a number of fundi are beautifully illustrated in colors. Students will derive benefit from a careful reading of this brochure. Copies, any number, may be obtained directly from the American Optical Company on request.

Abstracts of Current Literature

College Education for the Future Doctor

Dr. James B. Conant, president of Harvard University, discussed this topic at the Congress on Medical Education and Licensure held in Chicago, February 13, 1939. He said in part:

"Encourage college freshmen who are looking forward to a medical career to apply for admission to a medical school three years in advance. Let the admission committee base its rejection or conditional acceptance of such applications on the school record, on the first year college record, and on performance in such tests as the scholastic aptitude test. After the undergraduate in question has been tentatively enrolled as a future medical school student, let there be cooperation between the medical school and the college in working out through a joint committee an intelligent college program for the remaining three years. For those with a real scientific bent, concentration in chemistry or biology or a combination of the two may be in order. For others the main line of endeavor may be history or philosophy or literature with only the minimum amount of science. The program would be made to suit the student. The representatives of the medical faculty would have in mind the needs of the profession, and the representative of the college faculty would supply intimate knowledge of the student and the offerings of the institution in question. The joint committee should insist on every student's broadening out as much as possible during his college years. The fact that the medical school faculty was concerned with the college work of the premedical student would, I believe, lend an authoritative tone to any regulations which emphasized the importance of nonscientific studies. There are some undergraduates who follow more readily the guide of a professional faculty than the advice of college professors. In short, intelligent guidance would be possible. At present the competitive system and the mystery surrounding the science requirements put both the college teacher and the college student in a position where in many cases intelligent guidance is no more possible than in betting on a horse race. A further obvious advantage of the proposed scheme is that some 6,000 to 10,000 students who now prepare for medical school and fail each year to gain admittance would not be led down an educational path which comes to a dead end. Of course, even if this radical reform were widely adopted it would be necessary to reserve a certain number of places in each first year medical class for promising students who decided late in their college career to study medicine.

"Let me consider the question of the purely scholastic capacity of the student. At present this is estimated from the college record and from the letters that professors write about his actual ability in courses. The evidence which I have been able to gather indicates that there is a very close correlation, at least in Harvard College, between the work of the freshman year and the subsequent college record of the man. Furthermore, there is a fairly good correlation between many of the criteria which we use for admission such as school record and examination and the total college record. This being true, it is clear that there would be only a slight error introduced if the work of the freshman year and the school record were used as a basis for admission to the medical school instead of the present four years' work in college.

"Now I, for one, am not ready to advocate this radical departure on a large scale. But I should like to urge that a conference of deans of half a dozen medical schools and a couple of dozen liberal arts colleges might explore

the possibilities in this direction. What the proposal amounts to is a recognition that the four years in college and the four years in medical school be considered as a total educational unit and that the individual student be guided through these eight years by advice from both the college and the medical school authorities working together.

"If such a conference of college and medical school authorities could be convened for a discussion of this problem, there are one or two other less radical suggestions I should like to urge for consideration. First, I should like a subcommittee of biochemists from the medical faculty and chemists from the college to try to formulate some more concrete outline of the minimum requirements. Similarly, the anatomists and the physiologists on the one hand and the biologists on the other might come together. I am not afraid of too narrow a premedical course nor am I afraid that the medical schools would dictate to the colleges. I believe cooperation is much to be preferred to the present highly unsatisfactory exchange of mutual recriminations.

"Finally, I should like to urge upon the medical school faculties a serious consideration of ways and means of insuring that the future doctor may not only really receive the rudiments of a liberal education in college but be inspired to continue his liberal education throughout his professional course. To make any such proposal effective is difficult in the extreme. It can be done only if the medical school professors are willing to pay more than lip service to the ideals of a liberal education. Even four years in college devoted entirely to languages, literature, history, philosophy and the social sciences is too short a time to provide a truly liberal education. It is essential, it seems to me, to develop a sympathetic point of view in the medical schools toward a continuation of a student's education in something besides medicine. If the colleges will cooperate with the medical schools in guiding the student through the four years before he enters the medical school, will the medical schools in turn try to pay some attention to keeping alive the liberal arts tradition in the student's mind while he is studying medicine? Perhaps the history of medicine would provide in some instances the central core around which a continuation of liberal studies could be continued in a medical school. For others a discussion of the problems of socialization of medicine might furnish a basis for interest in something outside of medical work. Above all, if doctors could be made to acquire the habit of reading something other than scientific or professional literature on the one hand, or trash on the other, much of the complaint about the narrowly trained specialist would disappear. For the capable student who can work quickly there is time enough I feel sure. But the motivating force toward a liberal education is totally lacking in most of our professional schools today."

J.A.M.A., 112:1655 (Apr. 29), 1939.

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Lack of Correlation in Medical Course

The second cause of dissatisfaction expressed by medical practitioners and the leading educators pertains to the work in the medical school itself and the methods of presenting it to the students. There is a conspicuous lack of integration of the fundamental sciences and clinical medicine. The time honored system of medical training thrusts the student into two years of arduous study of the basic sciences and then abruptly transfers him to a study of the practical clinical problems in the hospital. In short, there is a wide gap between the basic sciences and clinical medicine; the former are divorced from the latter, with the result that seniors and recent graduates are woefully deficient in a knowledge of the fundamental sciences. This plan is open to criticism when one recalls that half of the period of medical training has been devoted to a study of preclinical subjects. The trouble rests in failure to correlate the basic sciences and clinical

medicine. It is futile to expect the student to retain a working knowledge of anatomy, for example, if he is divorced from the subject at the termination of the freshman year in medicine. The introduction of some genuine practical problems into the early years of medical training, and the pursuit of the fundamental sciences not for a greater number of hours but throughout the four year period of medical education in close association with clinical and preventive medicine, would mean that on the day of graduation the student was equipped with a knowledge of the basic sciences as serviceable as his knowledge of general surgery or internal medicine. Let us not be consumed by the ambition to recruit academicians and theoreticians from the student body. Let us focus on our objective, that of preparing men and women for the practice of medicine. — A. H. FURSTENBERG, *J.A.M.A.*, April 8, 1939, P. 1411.

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Postgraduate Education For Rural Physicians

Since the people have learned to depend on their physician to such a point that they will not accept a temporary substitute doctor for even a short period, postgraduate medical education in rural communities must be taken to him, Amos Christie, M.D., San Francisco, states in *The Journal of the American Medical Association* for April 29, 1939.

He suggests that this may best be done by a full time physician, whom he calls a circuit rider. This term has the connotation of the lawyer who pioneered the West, as did Abraham Lincoln in his day.

"A full time person," he believes, "well trained in a branch of clinical medicine and serving for not longer than two years, could learn much to take back to his medical center and by reason of his academic training could keep the practitioners in the outlying districts well up on his subject. By traveling from place to place, by knowing local conditions and by possessing factual information and tact, he might be able to raise the standards of medical practice to a high degree. Herein may lie the future of postgraduate medical education.

"There should be a well defined purpose before such a program is initiated. If its aim is to raise the standard of well baby conferences, all efforts should be directed to this purpose.

"The greatest need for postgraduate medical education or refresher courses in pediatrics is felt by men who have been away from medical school more than five years. More time must be allowed for those rural areas in which it is impossible for the physicians to leave their practices for refresher courses. Two weeks is insufficient for the accomplishment of anything constructive in any one area or district. One month or, preferably, two months should be the minimal requirement. The consultant should acquaint himself first with local conditions and the personalities peculiar to the area. In this way he can accomplish more, particularly if the available time is not spread too thinly over too wide an area.

"Choosing the person who is to act as consultant or instructor is most important. Time, thought and energy should be expended on obtaining the best possible physician."

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Anent "Premedical" Education

One hears dissatisfaction expressed on the count that premedical education deals with abstruse learning and has wandered far from its original purpose. Thirty years ago the premedical course was established to give the student a broad general education before he commenced the study of medicine. I doubt that this objective now dominates the picture. Analysis of the premedical curriculum discloses that it is composed largely of specific science subjects. The addition of numerous science studies has pushed the cultural ones out into the periphery of the curriculum. Students contemplating the study of medicine intuitively seek the science subjects, be-

lieving that they offer the best preparation for the study of medicine and frequently they are urged by educators to take advanced courses in biology and chemistry in order that they may start medical education on the highest possible scientific level. I know of several arts colleges where premedical students are urged to study the anatomy, embryology, biochemistry and physiology of man. Such a program, which includes medical subjects, defeats the purpose for which premedical education was designed. Instructors in medical schools complain of this plan, arguing that it taxes their strength and patience to repair the damage done the students by instruction in basic medical sciences presented from the standpoint of the academician rather than from that of the doctor of medicine. Such a program robs the premedical curriculum of its cultural subjects and deprives the student of his only opportunity to obtain a broad general education before he commences to study medicine.

I urge that greater flexibility in the premedical curriculum be promoted, that it be made less stereotyped and that it be opened up liberally to cultural subjects so that it will give the student a wider range of interests. The term premedical is an unfortunate one. It should not represent a course specifically preparatory to the study of medicine. It should give the student a mature intellect and a well disciplined mind and prepare him for any professional study in which he may wish subsequently to engage.

All of which leads me to appeal for a less rigid, less stereotyped premedical curriculum, one that will give the student a broad general education before he commences the study of medicine. If the physician finds a knowledge of physics, chemistry, botany and zoology essential to the practice of medicine, then let no one interfere with the present premedical curriculum. If he can get along, as I do and as many of my colleagues do, without a speaking acquaintance with these subjects, then may I beg that a searching consideration be given to a problem of vital importance to the medical profession.

A. H. FURSTENBERG, *J.A.M.A.*, April 8, 1939, P. 1410.

Book News

Principles of Human Anatomy

With Synopses and Bibliography. By Charles F. DeGaris, M.D., Ph.D. Professor of Anatomy; Ernest Lachman, M.D., Assistant Professor of Anatomy and Ralph E. Chase, A.M., Instructor in Anatomy, University of Oklahoma School of Medicine. Lea & Febiger, Philadelphia. 1939. Price $2.50.

This work sets forth the principles of anatomy as revealed by dissection of the human body. In its broad outline it follows the course instituted by the late Dr. F. P. Mall and later developed by Dr. L. H. Weed at the Johns Hopkins Medical School. This is the first detailed account of their teaching methods to be published.

Included in the schedule used by the authors in the University of Oklahoma School of Medicine is Dr. Weed's ingenious arrangement of student work, which he introduced at the Johns Hopkins Medical School without impairing the content of his course or altering the spirit of inquiry so characteristic of his laboratory. Certain additions offered here bring before the student, as part of his work, demonstrations of structures and relations usually seen only in special dissections and text figures. Also in accord with the present trend of anatomical teaching are various synopses of factual matter and a comprehensive bibliography.

Written to meet the needs of the student and to impart to him the self-assurance, discernment and curiosity of an independent worker, this book is a distinct contribution to the study of human anatomy.

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What It Means to Be a Doctor

By Dwight Anderson. Public Relations Bureau, Medical Society of the State of New York, New York City. 1939.

This volume is a brief treatise aiming to convey an impression of the doctor's way of life; his character, his education, his ability, and his skill. A questionnaire which asked four questions was sent to 500 general practitioners, surgeons, pediatricians, and many other specialists throughout the country. The replies are digested. The author then pursued inquiries which are made a part of the book in the narrative of the careers of three typical personalities, traced through childhood, boyhood, medical school, hospital training and private practice, and a little way into some of the work of his medical societies and scientific organizations.

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The Patient as a Person

A Study of the Social Aspects of Illness. By G. Canby Robinson, M.D., Lecturer in Medicine, Johns Hopkins University. The Commonwealth Fund, New York. 1939. Price, $3.

With the cooperation of the staff of the Johns Hopkins Hospital, Dr. Robinson studied a series of unselected patients. What this study revealed as to the social conditions of these patients and their emotional reactions to factors apparently lying outside the range of physical pathology is reported in detail.

Case histories illustrate the social and emotional status of patients with tuberculosis, cardiovascular symptoms, and diabetes; the significance of poverty, friction in the home, and emotional shock as contributing factors in gastrointestinal disorders and asthma; and the need for checking recommendations for medical treatment against the intelligence of the patient who is to carry them out and his ability to do so.

Dr. Robinson reaches the conclusion that an understanding of the way in which problems involving the patient as a person bear on a given illness is no less essential than the medical history,

physical diagnosis, and all the technical procedures now available to the physician, if a sound diagnosis is to be made and effective treatment planned and applied.

The book should stimulate serious thought on the part of all who have responsibility for relating medical service to the health of the patient as a person. It contains material bearing on problems needing careful consideration at this time of changing attitudes toward medical care, preventive medicine, and mental hygiene.

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Gardiner's Handbook of Skin Diseases

Revised by John Kinnear, M.D., Lecturer in Diseases of the Skin, St. Andrew's University, Dundee, England. 4th Ed. William Wood & Company, Baltimore. 1939. Price, $3.50.

This work is written especially for the student. It is of small size, well illustrated in black and white and color, well arranged, free from argumentation. The author presents his views as well as those of Dr. Gardiner. Students will appreciate this text.

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An Introduction to Dermatology

By Norman Walker, M.D., Consulting Physician, and G. H. Percival, M.D., Physician for Diseases of the Skin, The Royal Infirmary, Edinburgh. 10th Ed. W. Green & Son, Edinburgh. 1939. Price, $5.

Based on the senior author's lectures, it presents a full discussion of the more common skin diseases. It is profusely and well illustrated with black and white and color pictures. The many fine plates will have a special appeal to the student because of their splendid portrayal of the diseases depicted.

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Hypertension and Nephritis

By Arthur M. Fishberg, M.D., Associate in Medicine, Mount Sinai Hospital, New York City. 4th Ed. Lea & Febiger, Philadelphia. 1939. Price, $7.50.

A radical revision of previous texts has been made. So much new material has been added that the new edition is over 100 pages larger than its predecessor. Many chapters have been largely rewritten and a new chapter on azotemia has been added. Of special interest is the detailed discussion of the surgical treatment of essential hypertension by an internist who has followed the patients for long periods both before and after the operation. Among the other sections which have been added or in which the text has been rewritten are: Prerenal azotemia, the differentiation of glomerular and tubular elements in renal failure, clearance tests, the plasma proteins in the nephrotic syndrome, the Addis count, mercurial diuretics, the Cushing syndrome, paroxysmal hypertension in chromaffine tumors, the pathogenesis of the malignant phase of essential hypertension, and the nature and treatment of the toxemia of pregnancy.

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The Genuine Works of Hippocrates

Translated from the Greek by Francis Adams, LL.D., Surgeon. With an Introduction by Emerson C. Kelly, M.D. Williams & Wilkins Company, Baltimore. 1939. Price, $3.

Every medical man should have a copy of this excellent work. It is most interesting reading and from the book maker's viewpoint, it is a real work of art.

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Physiology and Pharmacology of the Pituitary Body

Vol. II. By H. B. Van Dyke, Head of the Division of Pharmacology, Squibb Institute for Medical Research, New Brunswick, New Jersey. University of Chicago Press, Chicago. 1939. Price, $4.50.

Dealing with the functional aspects of the pituitary, this entirely new volume covers all the experimental work in the field from late 1935, where the previous volume left off, to 1938. Many recent advances have been made in the

biology of the hypophysis, here considered in detail. The bibliography contains more than 1,400 titles issued during the years between Volumes I and II.

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Clinical Pathological Gynecology

By J. Thornwell Witherspoon, M.D. Formerly Associate Professor of Experimental and Pathological Gynecology, Indiana University Medical Center. Lea & Febiger. Philadelphia. 1939. Price, $6.50.

This book is an introduction to clinical pathological gynecology based on the author's teaching experience. In it the more common clinical diseases are studied in detail. This study is followed by clinical interpretations of the etiology, symptoms, signs, treatment and prognosis of each condition, presenting the pathological and clinical pictures of each disease. The text gives a thorough understanding of gynecological pathology and a comprehensive review of the clinical aspects of each pathological condition. It avoids the theoretical and to that end the discussion of embryology, congenital anomalies and the anatomy of the female pelvic organs, except for a few illustrations, is purposely omitted.

The material is arranged in anatomical locations rather than under similarity of diseases, thus, all pathological conditions related to the vulva are discussed under vulval lesions and those of the ovary under ovarian diseases. Infections and tumors pertaining to these locations are developed in the order named. The 271 engravings provide visual as well as verbal teaching. A clinical or gross specimen photograph and both magnified and microscopic photographs are provided for each disease that is studied. The pathological descriptions of the various conditions are described in the text. Most of the illustrations are original. No attempt has been made to present extensive bibliographies but the more important references are noted immediately after each gynecological disease.

Biology of Bacteria

An Introduction to General Microbiology. By Arthur T. Henrici, M.D., Professor of Bacteriology, University of Minnesota. 2nd Ed. D. C. Heath and Company, Boston. 1939. Price, $3.60.

For students who will take but one course in microbiology and for students who will receive the applications of the science in advanced courses. Pure science is stressed. The text has been completely revised, even nomenclature and classification. Several new chapters have been added dealing with the effect of environmental factors on bacteria and their distribution in soil, water, milk and the human body.

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Pye's Surgical Handicraft

A Manual of Surgical Manipulations, Minor Surgery and Other Matters Connected with the Work of House Surgeons and of Surgical Dressers. Edited by Hamilton Bailey, F.R.C.S. Eng. Surgeon, Royal Northern Hospital, London. 11th Ed. William Wood and Company, Baltimore. 1939. Price, $6.

A fifty-year old book completely recast by twenty-nine contributing authors. It contains a wealth of information of value to the student as well as the practitioner; is profusely illustrated and most commendably indexed. A good book to have at one's hand all the time for the care of emergencies.

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Bergey's Manual of Determinative Bacteriology

A key for the Identification of Organisms of the Class Schizomycetes. By David H. Bergey, Formerly of the University of Pennsylvania; Robert S. Breed, Cornell University; E. G. D. Murray, McGill University; A. Parker Hitchens, University of Pennsylvania and Others. 5th Ed. The Williams and Wilkins Company, Baltimore. 1939. Price, $10.

For the bacteriologist: descriptions of 1,335 species with a reference to the original place of publication of 5,600 descriptions.